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Original Paper

# Revision of the genera *Agrocybe* and *Cyclocybe* (Strophariaceae, Agaricales, Basidiomycota) in Argentina

*Revision of the genera Agrocybe and Cyclocybe (Strophariaceae, Agaricales, Basidiomycota) in Argentina*

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**Abstract**

*Agrocybe* is characterized by the collybioid to tricholomatoid basidiomata with rusty to dark spore-print, a hymeniform pileipellis, and basidiosspores with a reduced to broad germ-pore. Recently, the species with reduced germ-pore were segregated to *Cyclocybe*. The knowledge of these genera in Argentina is scanty, although they have been partially studied in the country, but there is not a field that deals exhaustively with it. Macro- and micromorphological characters of specimens obtained in the feld and from different national herbaria (BAFC, CTES, LIL, LPS) were analyzed. Cultivation techniques were used to obtain basidiomata, allowing for a macro- and micromorphological study of fresh developing basidiomes. We concluded that in Argentina there are, so far, 14 species of *Agrocybe* (one of them with 3 varieties) and two of *Cyclocybe* including to C. *wrightii*, which is proposed as a new combination. Sixteen species are described and a key to the Argentinian species of *Agrocybe* and *Cyclocybe* is proposed.

**Key words**: biodiversity; taxonomy; South America; *Cyclocybe wrightii.*

**Resumen**

*Agrocybe* se caracteriza por sus basidiomas collibiodes a tricholomatoides, esporada con coloraciones ferrugineas a oscuras, pileipellis himeniforme y esporas con poro germinativo. Recientemente, las especies con poro germinativo reducido fueron segregadas a *Cyclocybe*. El conocimiento de estos géneros en Argentina es escaso, aunque hay estudios parciales de varios micólogos, no hay un trabajo que lo trate exhaustivamente en forma conjunta. Se analizaron caracteres macro y micromorfológicos de especímenes colectados y de diferentes herbarios nacionales (BAFC, CTES, LIL, LPS). Se utilizaron técnicas de cultivo para obtener basidiomas, lo que permitió un estudio macro y micromorfológico de material fresco en desarrollo. Concluimos que en Argentina hay, hasta el momento, 14 especies de *Agrocybe* (una de ellas con tres variedades), y dos especies de *Cyclocybe*, incluyendo a *C. wrightii*, la cual es propuesta como una nueva combinación. Se describen dieciséis especies y se propone una clave para las especies argentinas de *Agrocybe* y *Cyclocybe*.

**Palavras-chave**: biodiversidad; taxonomía; América del Sur; *Cyclocybe wrightii.*

## Introduction

*Agrocybe* Singer is characterized by the collibioid to tricholomatoid basidiomata with rusty brown, tobacco brown or dark brown spore-print, a glabrous or sometimes aerolate pileus surface, its basidiospores with a broad germ-pore (sometimes some reduced), a hymeniform pileipellis composed of a palisade of inflated cell and with conspicuous cheilocystidia (Pegler 1983; Singer 1986; Largent & Baroni 1988).

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*Agrocybe* was included in the Bolbitiaceae due to the pileipellis characters and the spore-print color (Singer 1986). However, Matheny *et al*. (2006) considered it as a polyphyletic genus belonging to Strophariaceae. Considering this, Vizzini *et al.* (2014) and Vizzini (2014) transferred some species to genus *Cyclocybe* (V. Brig.) Vizzini. They based their study on LSU and ITS sequences analysis concluding that *Agrocybe* is highly polyphyletic and that the species they examined were distributed in 4 clades: Agrocybe *s. stricto*, that comprises *A. preacox* (Pers.) Fayod, *A. smithii* Watling & H.E. Bigelow, *A. putaminum* (Maire) Singer and *A. pediades* (Fr.) Fayod, Agrocybe part 1, wich includes *A. erebia* (Fr.) Singer, *Cyclocybe erebioides* Angelini & Vizzini, *A. cylindraceae* (DC.) Maire and *A. parasitica* G. Stev.; Agrocybe part 2, that includes *A. arvalis* (Fr.) Singer; and Agrocybe part 3 comprising *A. dura* (Bolton) Singer and *A. vervacti* (Fr.) Singer (Vizzini *et al*. 2014) Therefore, species such as *Agrocybe erebia* and *A. cylindracea s.l.* are now belonging to the resurgent old genus *Cyclocybe*. Vizzini *et al.* (2014) considered that *Cyclocybe* comprises larger species of *Agrocybe s.l.*, with membranous ring and basidiospores with germ-pore rudimentary or absent. Taxonomically, these are complex genera, with species with circumscription conflicts as *C. aegerita* (V. Brig.) Vizzini versus *C. cylindracea* (DC.) Vizzini & Angelini (Uarth & Albertó 2007; Alam *et al*. 2010), or *A. neocoprophila* Singer versus *A. fimicola* (Speg.) Singer (Watling 1992; Watling & Richardson 2010).

In addition, these genera have a practical importance since several species of *Agrocybe* and *Cyclocybe* are edible and can be commercially cultivated (Singer 1986; Uhart *et al*. 2008), and some antibiotics have been described, as Agrocybin (Ngai *et al*. 2005) and Agrocybenine (Koshino *et al*. 1996).

The knowledge of the genera *Agrocybe* and *Cyclocybe* in Argentina is scanty, although it has been partially studied by many mycologists. Spegazzini (1880a,b, 1881, 1889, 1899, 1922, 1926a,b), Singer & Digilio (1952), Singer (1950, 1951, 1953, 1954, 1959, 1969, 1977), Horak (1980), Raithelhuber (1974, 1977, 1988, 1991, 2004), Ramadori (1992), Watling (1992), Wright & Albertó (2002), Uhart & Albertó (2007) and Lechner (2015) described species of the genus in this country. Recently, Niveiro & Albertó (2012 a,b, 2013, 2014) in a checklist of brown-spored mushrooms from Argentina reported 18 *Agrocybe* species. The aim of this paper is to present a synopsis of all described *Agrocybe* species from Argentina.

## Material and methods

### Macro- and micromorphology

We examined all *Agrocybe* specimens from Argentina deposited in BAFC, CTES, LIL and LPS herbaria. Examination of microscopic features of basidiomatas was undertaken following Albertó *et al.* (1996), mounting free-hand sections in 5% KOH and 1% phloxine. New specimens collected were deposited in BAFC Mycological Herbarium (Buenos Aires, Argentina). For species lacking fresh collections, dry specimens from herbaria were examined, and the anatomical features were only described microscopically. In these cases, a transcription of the description based on fresh specimens made by different authors (Singer & Digilio 1952; Singer 1959, 1973; Horak 1980; Lechner 2015) is presented. Colour names are according to Maerz & Paul (1930). Names of author's taxa are according to the Index Fungorum web page (<www.Indexfungorum.org>). Herbaria abbreviations follow Thiers (2017 - continuously updated). Synonymy was included only when considered relevant for Argentinean taxa.

### Basidiomata culturing

To complement the study of macro- and micromorphology, fresh basidiomata were obtained according the methodology proposed by Uhart *et al*. (2008). Supplemented wheat straw was introduced in polypropylene bags and autoclaved at 121 °C during 2.5 h. After cooling, bags were inoculated with spawn of different strains and incubated under controlled conditions in the dark at 25 °C. After 40 days, bags were kept at 18–20 ºC with 9 h light and 15 h dark photoperiod to induce basidiomata production.

### Strains

Strains used for basidiomata production are conserved in the ICFC (IIB-INTECH Collection of Fungal Cultures, Laboratory of Mycology and Mushroom Cultivation, IIB-INTECH, Chascomús, Argentina; reference in the WDCM database: WDCM 826). Geographic origins, collection dates, collectors, original substrates (if available), collection and field numbers are listed on Table 1 of supplementary information.

**Table 1** – Strains used for basidiomata production.

| Species | Geographic origins | Collection date | Collectors | Original substrates | Strains |
|---|---|---|---|---|---|
| *C. cylindracea* | Argentina. Buenos Aires, Capital Federal | 27-IV-1994 | unknown | on *Populus* sp | ICFC 424/01 (WT-57) |
| *C. cylindracea* | Argentina. Buenos Aires, Lanus | unknown | J. R. Deschamps | on *Acer negundo* trunk | ICFC 440/01 (WT-59) |
| *C. cylindracea* | Argentina. Buenos Aires, Chascomús | unknown | E. Albertó | on dead trunk | ICFC 462/02 (WT-55); |
| *C. cylindracea* | Argentina. Buenos Aires, Chascomús | 27-III-2002 | Sannazzaro | on dead trunk | ICFC 461/02 (WT-58) |
| *C. cylindracea* | France. Unknown exact locality | 2001 | unknown | obtained from breeding of monokaryotic French isolates H99 x H355 | ICFC 299/00 (WT-78); |
| *C. wrightii* | Argentina. Misiones, Urugua-i Provincial Reserve | 26-V-2001 | E. Albertó & R. Petersen | on dead trunk | ICFC 446/01 (WT 54). |

Table 1: Strains used for basidiomata production

## Results and Discussion

We recorded 21 *Agrocybe s.l.* species from Argentina; 16 species, including 14 *Agrocybe* (one of them with 3 varieties), and two *Cyclocybe* were studied and described here: *A. allocystis, A. brodwayii, A. howeana, A. molesta, A. neocoprophila, A. paradoxa, A. pediades, A. perfecta, A. platensis, A. praecox, A. puiggarii, A. retigera, A. tucumana, A. xerophytica,* and two *Cyclocybe* species: *C. cylindracea,* and *C. wrightii*, which *is* the new combination proposed here.

Six species, *A. irritans* Raithelh. (Raithelhuber 1984, 2004), *A. cubensis* (Murr.) Singer, *A. elatella* (P. Karst.) Vesterh. [Raithelhuber (1977, 2004), as *A. paludosa* (J.E. Lange) Kühner and Romagn.]*, A. vervacti* (Fr.) Singer [Spegazzini 1899, 1926a, as *Naucoria vervacti* (Fr.) Quél.], and *A. procera* Singer (Singer 1969, Raithelhuber 2004), with two varieties: *A. procera* var. *andina* Raithelh. (Raithelhuber 1977) and *A. procera* var. *andinopatagonica* Raithelh. (Raithelhuber 1984, 2004), were not sdudied here because of lacking any preserved material.

## Taxonomy

**Key to *Agrocybe* and *Cyclocybe* species in Argentina***

1. Basidiospores truncate with a germ-pore, or reduced and slightly truncated. Development paravelangiocarpic; veil present or absent; with clamp-connections (*Agrocybe*) ..... 2
1'. Basidiospores without or with a reduced germ-pore, exceptionally wide and truncated in some spores. Development bivelangiocarpic; ring-shaped veil well developed, with or without clamp-connections (*Cyclocybe*) ..... 17
    2. Veil generally well developed forming a annulus or as marginal patches in the pileus ..... 3
    2'. Veil usually absent or fleeting ..... 8
        3. Pleurocystidia present and conspicuous or otherwise with spores less than 13 mm long, generally < 10 mm long ..... 4
        3'. Pleurocystidia generally absent, rarely present but if so inconspicuous and isolated and basidiospores (as in most species) > 11.5 mm long ..... 6
            4. Large pleurocystidia, 46–77 × 22–48 mm ..... *Agrocybe broadwayi*
            4'. Smaller pleurocystidia, up to 53 ×25 mm ..... 5
                5. Pileus somewhere or entirely rough-reticulated. Basidiomata growing in grasslands ..... *Agrocybe retigera*
                5'. Pileus smooth or eventually rough or with striated margin. Basidiomata growing in forests ..... *Agrocybe neocoprophila*

6. Pileus with appendiculate velar remnants ..... *Agrocybe pediades* var. *fimicola*
6'. Pileus without appendiculate veil remnants ..... 7
7. Basidia 4-sterigmata ..... *Agrocybe pediades* var. *pediades*
7'. Basidia 2-sterigmata ..... *Agrocybe pediades* var. *bispora*
8. Basidiospores apically truncated with a germ-pore ..... 9
8'. Basidiospores with a narrow germ-pore, or at least not truncate ..... 16
9. Pleurocystidia capitate, thick-walled ..... *Agrocybe allocystis*
9'. Pleurocystidia thin-walled ..... 10
10. With remarkable veil remains, forming a well-developed ring 11
10'. With fleeting veil remains, forming a not persistent thin ring ..... ..... *Agrocybe paradoxa*
11. Lamellae free ..... *Agrocybe perfecta*
11'. Lamellae annexed, adnate to subdecurrent, never completely free 12
12. Basidiospores > 11.5 mm long ..... 13
12'. Basidiospores < 11.5 mm long ..... 15
13. Pleurocystidia mucronate. In forests ..... *Agrocybe puiggarii*
13'. Pleurocystidia not mucronate, broadly rounded. In grasslands ..... ..... 14
14. Basidiospores 12–14 mm long ..... *Agrocybe molesta*
14'. Basidiospores 10–12 mm long ..... *Agrocybe platensis*
15. Silky stipe. Bitter taste ..... *Agrocybe howeana*
15'. Stipe different. Mild taste ..... *Agrocybe praecox*
16. With brownish sclerotized basidia. On sandy soil .. ..... *Agrocybe xerophytica*
16'. Without brownish sclerotized basidia. On humus .. ..... *Agrocybe tucumana*
17. Pileus large, 50–200 mm broad, dark brown in the center ..... *Cyclocybe cylindracea*
17'. Pileus small, < 60 mm, pale yelow at the centre, cream white at the margin ..... ..... *Cyclocybe wrightii*

## Taxonomic treatment

***Agrocybe allocystis*** Singer, Beih. Nova Hedwigia 29: 225. 1969. Fig. 1a-e

Pileus rusty orange to ochraceous brown, darkening in the center when young, uniformly coloured at maturity, hygrophanous, subviscid, glabrous, entirely smooth, convex to flat-convex, occasionally broadly umbonate, 25–65 mm diam, with velar remnants forming white spots especially at margin in younger specimens, with scales in the margin. Lamellae gray clay to dark brown, crowded, sinuate, adnate to subdecurrent. Stipe ochraceous to cream, subglabrous to fibrillose, hollow, cylindrical, equal, 30–75 × 3–6 mm, with abundant white basal mycelium with rhizomorphs. Annulus absent or evanescent, with a faint shade concolorous with the stipe. Spore-print rusty to purple ocher. Context white to ochraceous, up 2 mm thick at the disk. Odor farinaceous, taste sweetish. Solitary or gregarious.

Basidiospores 10–16 × 7–10.5 μm, Q= 1.5 (n= 140), ellipsoid, smooth, ochraceous brown, apically truncate with a germ-pore (Fig. 1a). Basidia (26–)27–44 × (7–)8–11(–12) μm, clavate, some throttled in the middle portion, hyaline, thin-walled, with broad sterigmata, mostly 4-spored, occasionally 2-spored (Fig. 1b). Pleurocystidia (28–)30–87 × 7–19(–20) μm, ventricose to lageniform, apically subcapitate to capitate, (2–)4–9 μm diam., sometimes with the throttled apex, and/or covered by a cap-shaped structure, rarely with inconspicuous encrusted crystal, most with the thickened wall (1–3 μm) from the base to below the apex (Fig. 1c), hyaline, with yellowish walls in KOH. Cheilocystida similar to pleurocyistidia, sometimes smaller (22–30 × 5–10 μm) and less thickened walls. Hyphae with clamp-connections. Pileipellis hymeniform, constituted by clavate cells, 20–25 × 7–9 μm (Fig. 1d), yellowish.

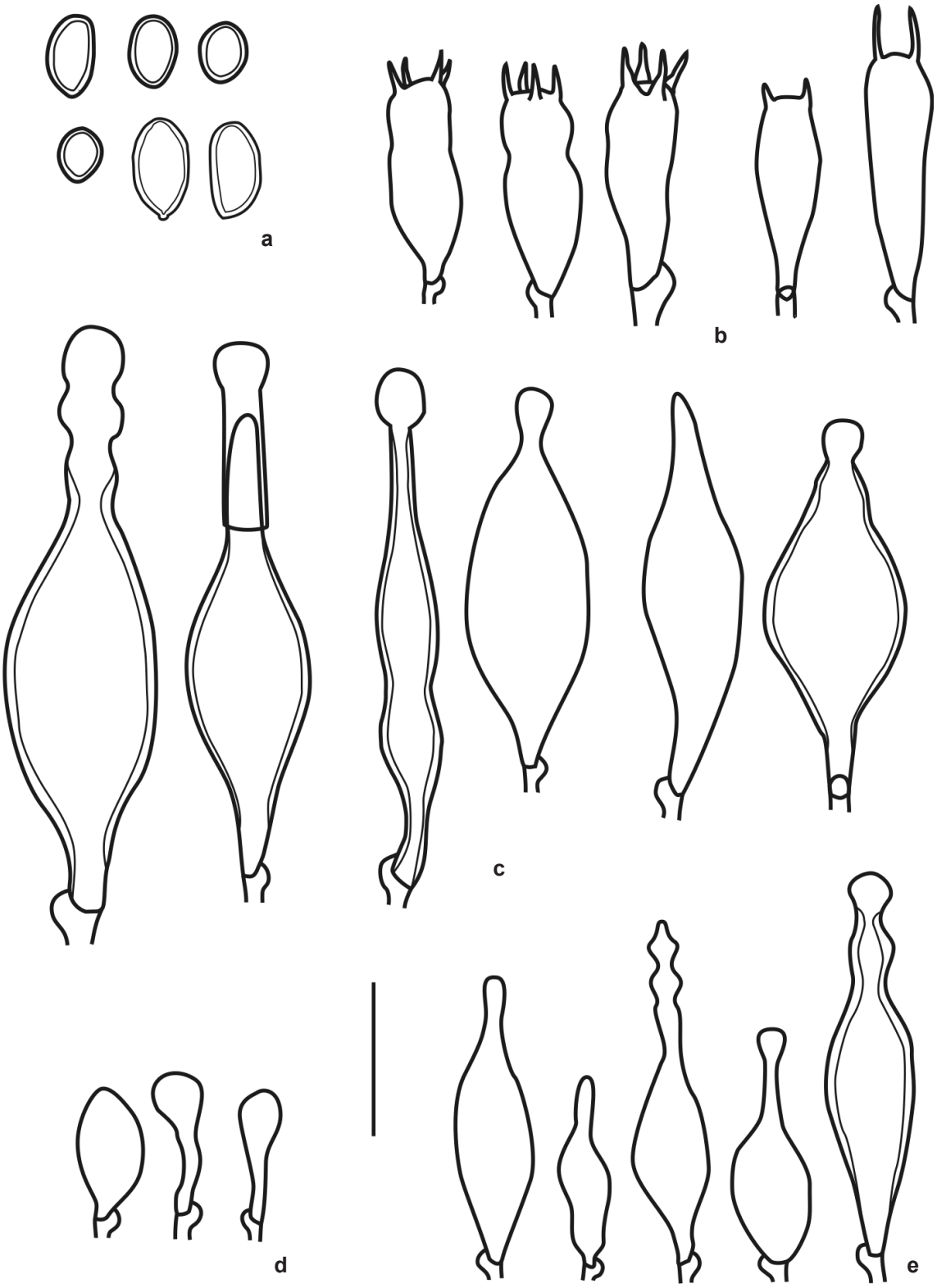


**Figure 1** – *Agrocybe allocysitis* – a. basidiospores; b. basida.; c. pleurocystidia; d. pileipellis cell; e. caulocystidia. Scale bar = 20 μm.

Pileocystidia not observed. Caulocystidia similar to cheilocystidia (Fig. 1e).

**Material examined**: ARGENTINA. BUENOS AIRES: Necochea, on dung, 23.III.1967, leg. H. Buck (BAFC 31888); de la Ventana hills Club Hotel, *ad fimum*, 15.XI.1962, leg. *J.E. Wright & R. Singer S 348* (BAFC 25289), Type; San Borombón river, *ad fimum*, 25.XII.1965, leg. *R. Singer S 617* (BAFC 30645); Chascomús, Adela lake, on dung, 17.VII.2000, leg. *R. Escaray* (BAFC 51023); INTECH field, passing the brook, on dung, 5.VII.2000, leg. *A. Sannazzaro & E. Albertó* (BAFC 51607); *ad fimum equinum in campis apricis*, 4.VI.1949, leg. *R. Singer S 83* (LIL) (LPS 18215); INTECH field, on dung, 24.I.2006, leg. *M. Uhart* (BAFC 51609); Avellaneda, Gerli, in pots with soil and horse manure, I.1947, leg. *M.H. Debat* (LPS 35813). CÓRDOBA: Pampa de Achala, *ad fimum in apricis montanis*, 13.XII.1966, leg. *R. Singer B 4313* (BAFC 30644). SALTA: Dpto. Cachi, Encantado valley, 3100 m above sea level, 26.III.1988, leg. *M. Salusso* (BAFC 31612). TUCUMÁN: 7 km North of Tafí del Valle, *ad terram stepposam in pascuis substerilibus,* 13.I.1950, leg. *Singer T 857* (LIL).

Because of its coprophilous habit, this species can be confused with *A. neocoprophila* Singer and *A. pediades* var. *fimicola* (Speg.) Nauta. The collections BAFC 31888 and T 857 were identified by Singer & Digilio (1952) as *A. coprophila* (Rick) Singer (synonym of *A. neocoprophila*), and the collection S 83 was identified by Singer (1950) as *A. fimicola* (Speg.) Singer (snonym of *A. pediades* var. *fimicola*). However, the three collections are the same and they clearly belong to *A. allocystis* since they present the capitated thickened wall pleurocystidia characteristic of this species.

Geographical distribution: South America. North and center of Argentina (Singer 1969; Raithelhuber 2004; Wright & Albertó 2002), Brazil (Meijer 2006) Uruguay and Chile (Singer 1969). Habitat and substrate: Dung and ground.

***Agrocybe broadwayi*** (Murrill) Dennis, Bull. Soc. mycol. Fr. 69 (2): 179. 1953. Fig. 2a-e

Description based on dried material: Basidiospores (11–)12–15(–16.5) × (7.5–)8–9(–11) μm, Q= 1.6 (n= 20), ellipsoid to oblong, some throttled in the middle, smooth, ochraceous brown, thick-walled, apically truncate with a germ-pore (Fig. 2a). Basidia 24–31 × 8–11 μm, clavate, hyaline, thin-walled, 4-spored (Fig. 2b). Pleurocystidia 46–77 × 22–48 μm, ventricose, thin-walled (Fig. 2c). Cheilocystidia 33–43 × 18–30 μm, similar to pleurocyistidia, but smaller. Hyphae with clamp-connections. Hymenophoral trama regular. Pileipellis hymeniform, constituted by vesicular-clavate cells, 28–50 × 18–29 μm, thin-walled and hyaline (Fig. 2d) or with slightly thickened wall and chestnut. Pileocystidia not observed. Caulocysitidia 45–82 × 7–10 μm, cylindrical with capitate apex (Fig. 2e).

**Material examined**: ARGENTINA. TIERRA DEL FUEGO: Lapataia, in ground under *Nothofagus pumilio*, 6-III-1963, leg. *E. Horak* (LPS 38016).

Horak (1980) described specimens in a fresh state: Pileus ochraceous-yellowish to pale ochraceous brown darker in the center, viscid, glabrous, smooth or wrinkled, especially in the center, convex to widely expanded umbonate, up to 55 mm diam, margin striated, occasionally covered with small concolorous squamules. Lamellae described as gray with a pale lilac or purple tint when young, becoming brownish in mature specimens, with white edge, narrow, ventricose, crowded, annexed to subfree. Stipe concolorous with the pileus or even paler, upper portion pruinose, with numerous appressed, pale chestnut squamules towards the base, hollow, fragile, cylindrical or gradually tapering towards the apex, subbulbous base, 50–100 × 3–8 mm; with conspicuous white rhizoids at the base. Spore-print chestnut. Context thin, white, pale brown beneath the cuticle. Odor and taste not discernible. Solitary or gregarious (Horak 1980). Fruiting in summer and autumn (Raithelhuber 1988).

The specimens reported by Horak (1980) and Raithelhuber (1988) from Tierra del Fuego are similar to the tropical specimens described by Pegler (1983). Dennis (1953) considered *Naucoria earlei* Murril as a synonym of *A. broadwayi*, however, the type material of the former has predominantly bisporic basidia and smaller basidiospores, reaching up to 12.5 μm long. (Singer 1965).

Geographical distribution: Pantropical, reported from the Lesser Antilles (Dennis 1953; Pegler 1983), French Guayana (Courtecuisse *et al*. 1996), Brazil (Coimbra 2015) and India (Watling & Abraham 1986). In addition, Horak (1980) reported this species from southern Argentina. Habitat and substrate: in grassland, in ground.

***Agrocybe howeana*** (Peck) Singer, Lilloa 22: 492. 1951. Fig. 3a-e

= ***Agrocybe praecox*** var. ***cutefracta*** (J.E. Lange) Singer, Sydowia 7: 214, 1953. *fide* Singer (1977).

Description based on dried material: Basidiospores (7–)9–11(–11.5) × 6–7 μm, Q =1.6 (n = 40), ellipsoid to oblong, smooth, with thick double wall, ochraceous brown, apically truncate

with a germ-pore (Fig. 3a). Basidia 26–30 × 7–9 μm, clavate, hyaline, thin-walled, 4-spored, occasionally 3-spored (Fig. 3b). Pleurocystidia (35–)40–55(–60) × (17.5–)20–25 μm, ventricose with rounded obtuse apex, thin-walled, hyaline (Fig. 3c). Cheilocystidia (35–)40–55(–60) × 20–25 μm subampullaceous with a broad mucronate apex (7–8 μm), thin-walled, hyaline (Fig. 3d). Hyphae with clamp-connections. Hymenophoral trama regular. Pileipellis hymeniform, constituted by vesicular-clavate cells, 25–35 × 8–25 μm (Fig. 3e). Dermatocystidia not observed.

**Material examined**: ARGENTINA. TIERRA DEL FUEGO: Nueva Argentina ranch*, in prope nortum inter herbas ad terram,* 13.II.1950*,* leg. *R. Singer M 257* (LIL)*.* 21.II.1950*,* leg. *R. Singer M 415* (LIL).

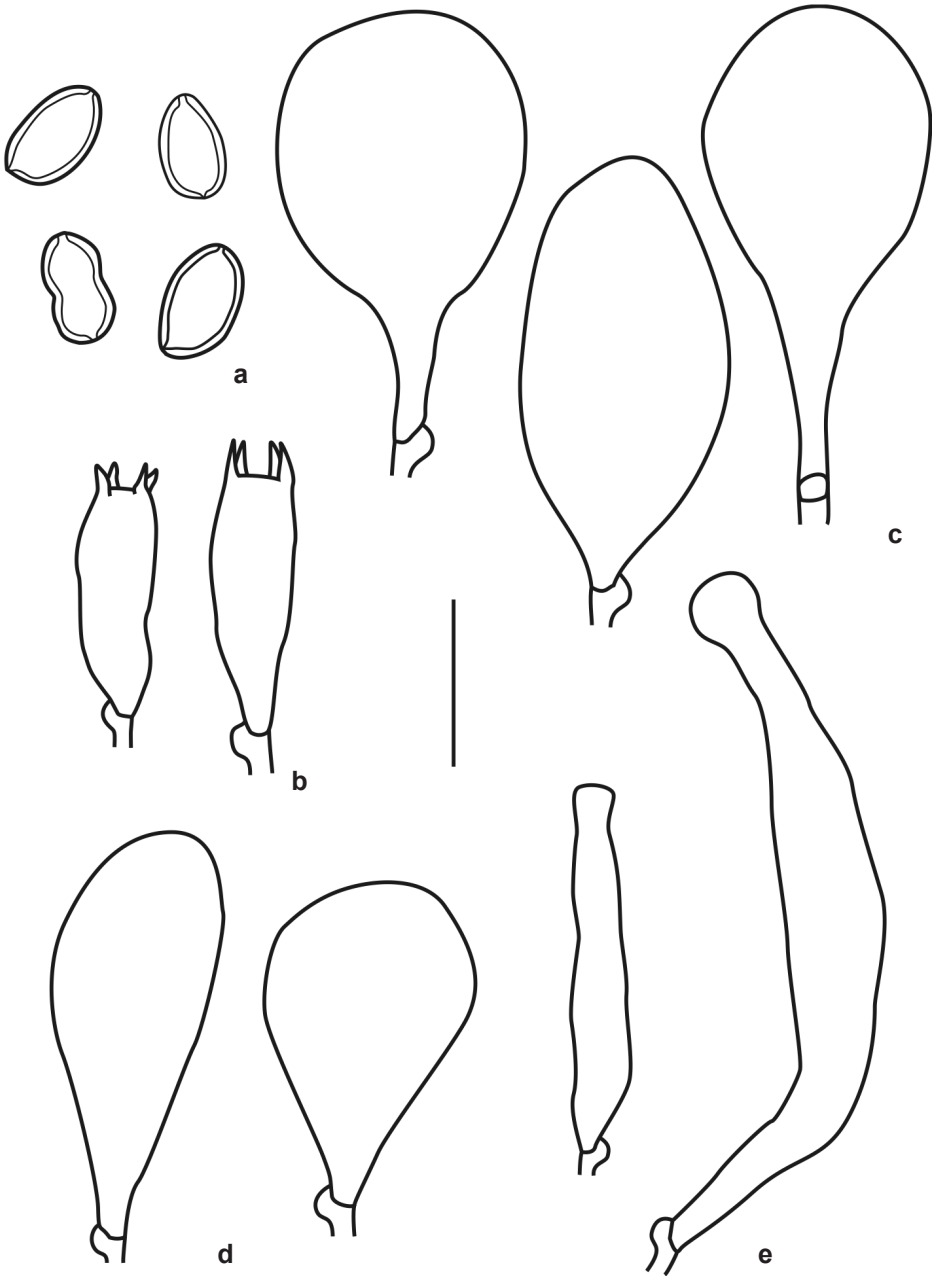


**Figure 2** – *Agrocybe broadwayi* – a. basidiospores; b. basidia; c. pleurocystidia; d. pileipellis cell; e. caulocystidia. Scale bar = 20 μm.

Singer & Digilio (1952) described fresh specimens: Pileus whitish becoming pale brownish yellow with age, slightly subviscid, glabrous, wrinkled when mature, convex to aplanate, 40–60 mm diam. Lamellae palid gray, ventricose, crowded, annexed or broadly adnate. Stipe white, becoming pale brown in aged specimens, cylindrical, equal or tapering towards the base or apex, 40–100 × 6–8 mm. Veil forming a white membranous annulus. Spore-print chestnut. Context whitish. Odor farinaceous, taste slightly bitter. Fruiting in February (Singer & Digilio 1952).

Both examined collections were determined as *A. praecox* var. *cutefracta* (Singer & Digilio 1952), however, *A. howeana* has smaller basidiospores, (7–)9–11(–11.5) × 6–7 μm and bitter taste, while *A. praecox* var. *cutefracta* has larger basidiospores, (6.5–)9–12.5(–13.5) × (5.5–)6.5–7.5(–8) μm, and mild taste. For these reasons Singer (1977) recognized these collections as *A. howeana*.

Geographical distribution: Temperate zones of South and North America (Watling & Gregory 1981). In Argentina, known from the south (Singer & Digilio 1952; Singer 1954; Raithelhuber 2004). Habitat and substrate: Solitary or gregarious, above ground.

***Agrocybe molesta*** (Lasch) Singer, Sydowia 30: 197. 1978.

This species was recently reported by Lechner (2015) from the Atlantic coast of Argentina: Pileus withish, then light chetnust, desarrollando escamas en la madurez por craqueo de la superficie, convex to plane, 40–80 mm diam. Lamellae white to chestnut, adnexed, crowed, Stipe off-white, smooth, cylindrical, 40–90 × 7–15 mm. Veil forming a narrow, white annulus. Context white. Spore-print chestnut. Basidiospores 12–14.5(–17) × 6.6–8.2 μm Q= 1.80 (n= 22), elipsoid, smooth, slightly truncated with a germ-pore. Basidia 29–32 × 8–10.5 μm, 4-spored. Pleurocystidia not observed. Cheilocystidia 39-5 × 10.5-18 μm, claviform, hyaline, thin-walled. Hyphae with clamp-connections. Pileipellis hymeniform, formed by vesiculose elements, 23.5–33 × 13.5–20 μm (Lechner 2015)

It is characterized by its whitish pileus surface, the presence of veil remains (as an annulus in the stipe and squamules in the pileus surface) and its relatively large basidiospores

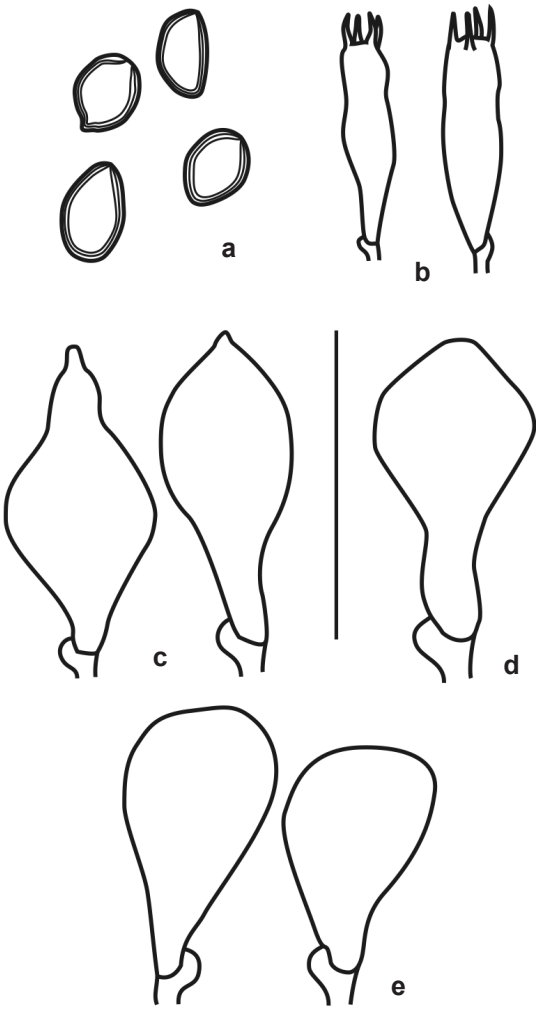


**Figure 3** – *Agrocybe howeana* – a. basidiospores; b. basidia; c. pleurocystidia; d. cheilocystidia; e. pileipellis cell. Scale bar = 20 μm.

(Lehner 2015). Watling (1982) considered *A. molesta* as a synonymous of *A. dura*, however was also recognized as another biological species according to sexual compatibility studies (Flynn & Miller 1990). *Agrocybe molesta* also is similar to *A. praecox* and *A. platensis*. However, by its cottony, loosely interwoven partial veil and graminicolous nutrition differ it from *A. praecox* (Flynn & Miller 1990), and differ from *A. platensis* in which the latter has smaller basidiospores (10–12 × 6–7 μm) and yellowish brown and smooth pileus surface (Singer & Digilio 1952; Lechner 2015).

Geographical distribution: Widspread (Flynn & Miller 1990; Watling 1992) Habitat and substrate: on roadside-verges, between grass.

***Agrocybe neocoprophila*** Singer, Lilloa 26: 95. 1953. Fig. 4a-f

≡ ***Hebeloma coprophila*** Rick, Broteria, Bot. 6: 79. 1907.

≡ ***Agrocybe coprophila*** (Rick) Singer, Lilloa 25: 327. 1952 (1951).

Description based on dried material: Basidiospores 10–13.5 × 6–8 μm, Q= 1.7 (n= 20), ellipsoid to oblong, smooth, with a double wall, ochraceous brown, apically truncate with a germ-pore (Fig. 4a). Basidia (23–)28–30 × 7–10 μm, clavate, hyaline, thin-walled, 4-spored, few 2-spored (Fig. 4b). Pleurocystidia 32–53 × 11–24 μm, ventricose to lageniform, with subcapitate to capitate apex, sometimes rounded ápex, hyaline (Fig. 4c). Cheilocystidia (15–)28–33(–50) × 7–10(–24) μm, similar to pleurocystidia, or similar to A. pediades, never broadly rounded and always narrower than pleurocystidia (Fig. 4d). Hyphae with clamp-connections. Hymenophoral trama regular. Pileocystidia 40–60 × 8–10 μm, cylindrical, capitate to subcapitate apex, hyaline (Fig. 4e). Caulocystidia 42.5–90 × 9–12.5, similar to pileocystidia (Fig. 4f).

**Material examined**: ARGENTINA. TUCUMÁN: Anta Muerta, San Javier hill, on subtropical forest, on cow dung, 16.IV.1950, leg. *R. Singer T 966* (LIL).

Singer & Digilio (1952) described this species in the fresh state: Pileus chestnut to ferruginous (Maerz & Paul 9-H-5), "Sorrel" (Maerz & Paul 13-J-11), "Raw Siena" (Maerz & Paul 13-L-10), sub-hygrophanous, sub-viscid, then dry, glabrous, smooth, conic to convex, then flattened, usually umbilicate, 9-60 mm diam. Lamellae dark chestnut, rusty brown to yellow brownish, wide or very wide, ventricose, close or crowded, tapering abruptly to become attached. Stipe concolorous or lighter, fibrillose-rough, with furrowed apex, rarely smooth, cylindrical, equal, often with basal bulb, 25–65 × 1,5–4 mm; basal mycelium tomentose, white, with white rhizomorphs. Veil inconspicuous and non-persistent. Spore-print rusty brown. Context white or off-white, unchanging, soft. Odor weak or without, taste farinaceous, not bitter (Singer & Digilio 1952). In summer and autumn (Raithelhuber 1974).

Singer & Digilio (1952) described cystidia with chestnut amorphous incrustation, and sometimes flexuous and hyaline cystidioles 30 × 6 μm. Probably, these structures were not preserved as they were not observed in the herbarium material studied. According to Singer & Digilio (1952), this species is very close to *A. amara* (Murrill) Singer, but *A. neocoprophila* differs by the mild taste, larger basidiospores, and absence of gray color in the marginal region of the pileus. *Agrocybe neocoprophila* is also very close to *A. broadwayi*, but microscopic differences as smaller spores and pleurocystidia in *A. neocoprophila* are conspicuous enough to be considered different (Figs. 4). In addition, *A. broadwayi* is off-white and with narrow lamellae, while *A. neocoprophila* is chestnut with wide or very wide lamellae. *Agrocybe neocoprophila* is a substitute name for *A. coprophila* (Rick) Singer (Singer & Digilio 1952), which was preoccupied by a different taxon: *A. coprophila* Singer, published in 1945 (Watling & Gregory 1981). Watling (1992) had considered *A. neocoprophila* as synonymous with *A. fimicola*, but later reconsidered them as close but independent taxa (Watling & Richardson 2010).

Geographical distribution: Known from southern Brazil (Singer 1953) and north-center Argentina (Singer & Digilio 1952). Habitat and substrate: ground or dung.

***Agrocybe paradoxa*** Singer, Sydowia 7: 76. 1973. Fig. 5a-d

Description based on dried material: Basidiospores (9.5–)12.5–22 × 9–14.5 μm, Q= 1.5 (n= 20), ellipsoid, smooth, some abnormally reniform or triangular and with two germ-pores, some with thick double wall, ochraceous brown, apically truncate with a broad germ-pore (Fig. 5a). Basidia 28–42 × 8–10 μm, clavate, thin-walled, with large sterigmata, hyaline, 2-spored (Fig. 5b). Pleurocystidia not observed. Cheilocystidia 25–42 × (6–)7–10 μm, with a ventricose basal body and capitate to subcapitate apex (2–6 μm diam.), rarely lecytiform and with two capitula, thin walled, hyaline (Fig. 5c). Hyphae with clamp-connections. Hymenophoral trama regular. Pileipellis hymeniform, constituted by vesicular-clavate cells, 14–29 × 8–11 μm, (Fig. 5d) hyaline or chestnut. Dermatocystidia not observed.

**Material examined**: ARGENTINA. TUCUMÁN: Tafí del Valle, road to Infiernillo, *ad terram in pratis subalpinis*, 2500 m, 29.I.1962, leg. *R. Singer T 3767, Type* (LIL), (BAFC 31889).

Singer (1973) described this species in the fresh state: Pileus "Mellow glow" to "Inca gold" (Maerz & Paul) or paler on the margin, chestnut ocher according to Raithelhuber (1988), not hygrophanous, not viscid, glabrous, smooth, convex, obtuse, 10–17 mm diam, with incurved and appendiculate margin, with poor and interrupted

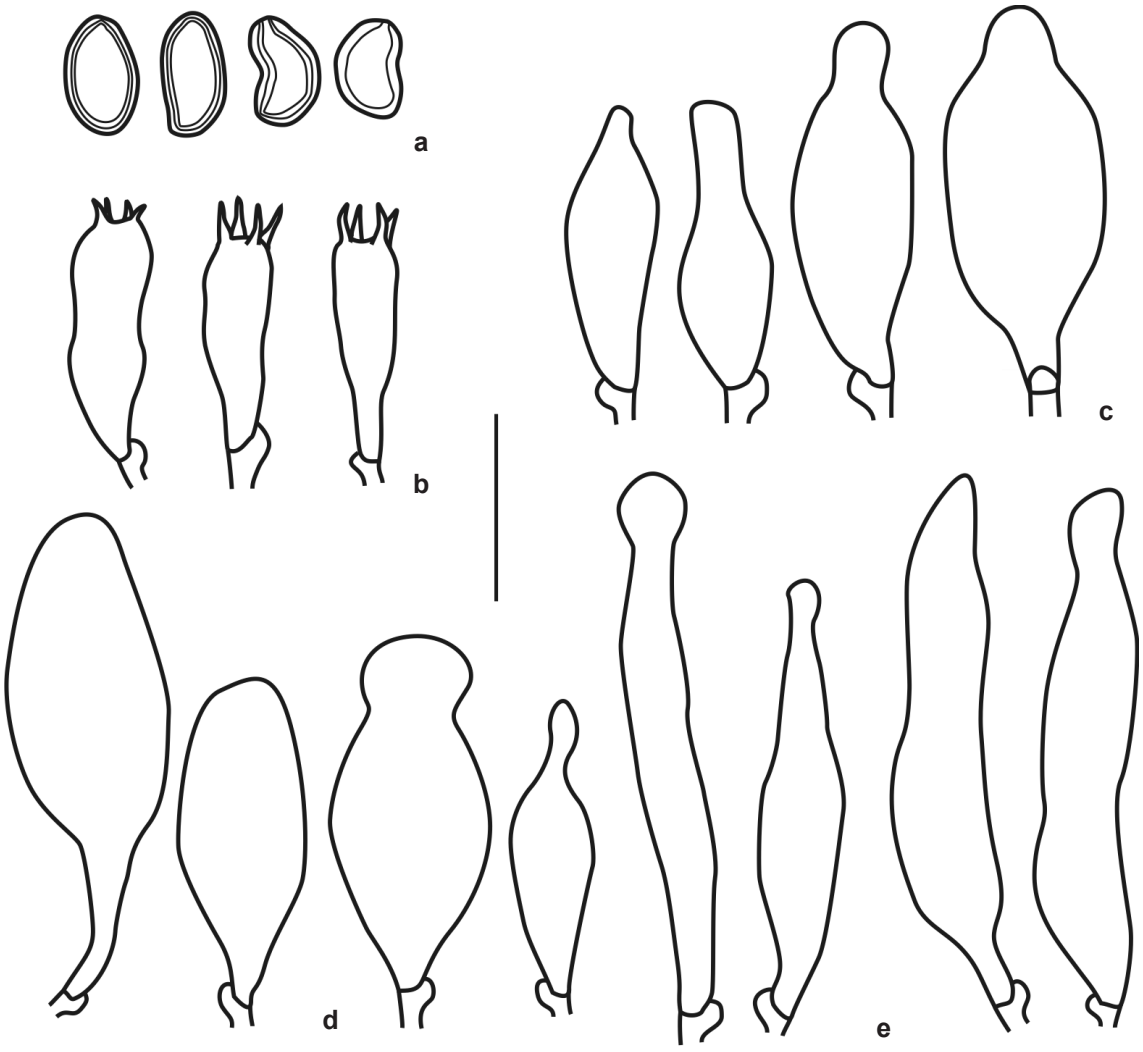


**Figure 4** – *Agrocybe neocoprophila* – a. basidiospores; b. basidia; c. cheilocystidia; d. pleurocystidia; e. pileocystidia; f. caulocystidia. Scale bar = 20 μm.

ochraceous veil which soon disappears. Lamellae clay gray to dark gray, eventually chestnut snuff by basidiospores, with pale edge, wide, moderately distant to crowed, adnexed to adnated. Stipe concolorous with the pileus, at first white, glabrous but often fibrillose, equal or slightly tapering down, sometimes with sub-bulbous base, 20–37 × 1.5–3.5 mm, with inconspicuous white rhizomorphs. Veil fleeting, which may form a thin annulus, but eventually lost. Context white. Odor weak or absent, taste farinaceous, not bitter.

Some structures described by Singer (1973) could not be observed in this study, probably due to the poor condition of the material: basidia 1-sterigmate, pseudoparaphysis interspersed with cheilocystidia, pleurocystidia scarce to several, and caulocystidia. Two types of pleurocystidia were described by Singer (1973): i) near the lamellae edge and similar to cheilocystidia, but larger, 45–55 × 15–16.5 μm, 1–2-capitate (one above the other), capitulum 6-8.2 μm, with constriction below 3–6 mm, hyaline to ocher, thin-walled or wall up to 0.5 mm wide, ii) smaller, 28–41(–70) × 7.5–14 mm, ventricose, some with one or two apical cylindrical appendages, thin-walled, hyaline. Caulocystidia similar to cheilocystidia.

Geographical distribution: Northwestern Argentina (Singer 1973; Raithelhuber 2004). Habitat and substrate: Soils, often between herbs, not in dense forests.

***Agrocybe pediades*** (Fr.) Fayod var. pediades, Ann. Sci. Nat. Bot., Ser. 7, 9: 358. 1889. Fig. 6a-f
= ***Agrocybe arenaria*** (Peck) Singer, Beih. Nova Hedwigia 29: 227. 1969. = *Agrocybe subpediades* (Murril) Watling, Kew Bull. 31: 592. 1977.

Pileus light chestnut to ochraceous, not hygrophanous, glabrous, smooth, not cracked at maturity, convex then applanate, 10–30 mm diam., margin entire, thin, incurved to plane. Lamellae ochraceous brown, with clearer edge, ventricose, subdistant, adnate. Stipe ochraceous brown, smooth, fragile, cylindrical, 10–45 × 10–30 mm. Annulus absent. Spore-print rusty brown. Context yellowish. Odor fungal, taste mild.

Basidiospores 11–15 × 7–10.5 μm, Q= 1.5 (n= 20), ellipsoid, smooth, thick-walled, nut-brown, apically truncate with a germ-pore (Fig. 6a). Basidia (31–)36–40 × (9–)10–11 μm clavate, hyaline, thin-walled, 4-spored (Fig. 6b). Pleurocystidia scarce, similar to cheilocystidia. Cheilocystidia 16–35 × (5–)6–8 μm, lageniform, capitate to subcapitate apex, thin-walled, hyaline (Fig. 6c). Hyphae with clamp-connections. Hymenophoral trama regular. Pileipellis hymeniform, constituted by vesicular-clavate cells, 12–25 × 5–8 μm μm (Fig. 6d). Pileocystidia (Fig. 6e) and caulocystidia (Fig. 6f) similar to cheilocystidia. **Material examined**: ARGENTINA. BUENOS AIRES: Martínez, 391 Sta. Rosa street, between lawn after rain, 11.II.1993, leg. J. E. Wright (BAFC 32989). URUGUAY. MALDONADO: Punta del Este: *ad arenas dunarum maritimarum*, 5.VII.1965, leg. *R. Singer B 4137* (BAFC 30641).

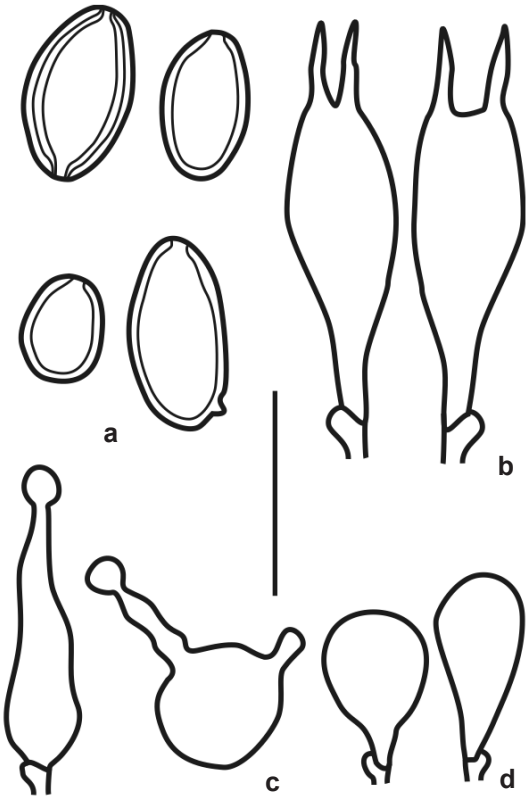


**Figure 5** – *Agrocybe paradoxa* – a. basidiospores; b. basidia; c. cheilocystidia; d. pileipellis cell. Bar = 20 μm.

This is one of the most common and problematic species, many authors distinguish several species close to *A. pediades* based on morphological characters such as pileus colour, viscidity, amount of veil, shape of pileus, spore size, although morphological studies have demonstrated most species to be synonymous or varieties within *A. pediades* (Nauta 2004, 2005). Malysheva & Kiyashko (2011), for Russian specimens, found that species considered morphologically different (*A. pediades*, *A. subpediades*, *A. semiorbicularis* and *A. arenicola*) are all phylogenetically related and would constitute a single taxon. However, they also observe that a group of specimens form a natural group, to which they assign the variety of *A. pediades* var. *bispora*. Nauta (2004) considered that *A. pediades* could probably be a species complex since they present a high morphological variability (Nauta 2004).

Even though there are a wide world discussion about the taxonomy of this species complex, there are not abundant descriptions of South American specimens. Coimbra (2015) cites this species in South America only in Argentina, where it is recordered by Singer (1969) and Wright & Albertó (2002). Singer (1969) described in the same work two varieties, *A. pediades* var. *pediades*, *A. pediades* var. *bispora* (as *A. semiorbicularis*), and characterized the first by the smaller spores (11–15 × 7–10.5 μm), absence of veil, the fulvous ochraceus pileus surface and palid stipe, wich is slightly silky to fibrillose and glabrescent.

Geographical distribution: Europe, North, and South America (Argentina). Habitat and substrate: various substrates (Nauta 2004), dung, sand, more commonly on the ground, among grass in gardens and parks.

***Agrocybe pediades*** var. ***bispora*** (A.N. Petrov) E.F. Malysheva and Kiyashko, Mycologia Balcanica 8 (2): 123. 2011. Fig. 6g-h
≡ ***Agrocybe semiorbicularis*** (Bull.) Fayod. Ann. Sci. Nat. Bot. Ser. 7, 9: 358. 1889.

This form differs from *A. pediades* var. *pediades* in that their basidia are always 2-spored

(Fig. 6g) instead of 4-spored, which results in increased spore size, (10–)11–19(–21) × (6–)7.5–13,5(–14.5) μm (Fig. 6h).

**Material examined**: ARGENTINA. BUENOS AIRES: Burzaco, 10.II.1993, leg. *E. Albertó* (BAFC 32988); on dense turf, 18.III.1993, leg. *E. Albertó (*BAFC 33228); Amenedo street, in field after rain, hot weather, 15.I.2001, leg. *E. Albertó* (BAFC 51608). MENDOZA: Las Heras, Crucecita, 20.XI.1938, leg. *R. Singer 5479*, (BAFC 30640). NEUQUEN: Puerto Manzano, *ad terram arenosam*, 19.III.1963, leg. *R. Singer 3073* (BAFC 30652); *ad terram*, 17.III.1963, leg. *R. Singer M 3062* (BAFC 30653).

This form differs from *A. pediades* var. *pediades* in that their basidia are always 2-spored (Fig. 6g) instead of 4-spored, which results in increased spore size, (10–)11–19(–21) × (6–)7.5–13,5(–14.5) μm (Fig. 6h). *Agrocybe pediades* var. *bispora* was considered by Singer a synonym of *A. semiorbicularis* (Singer 1969; Watling &

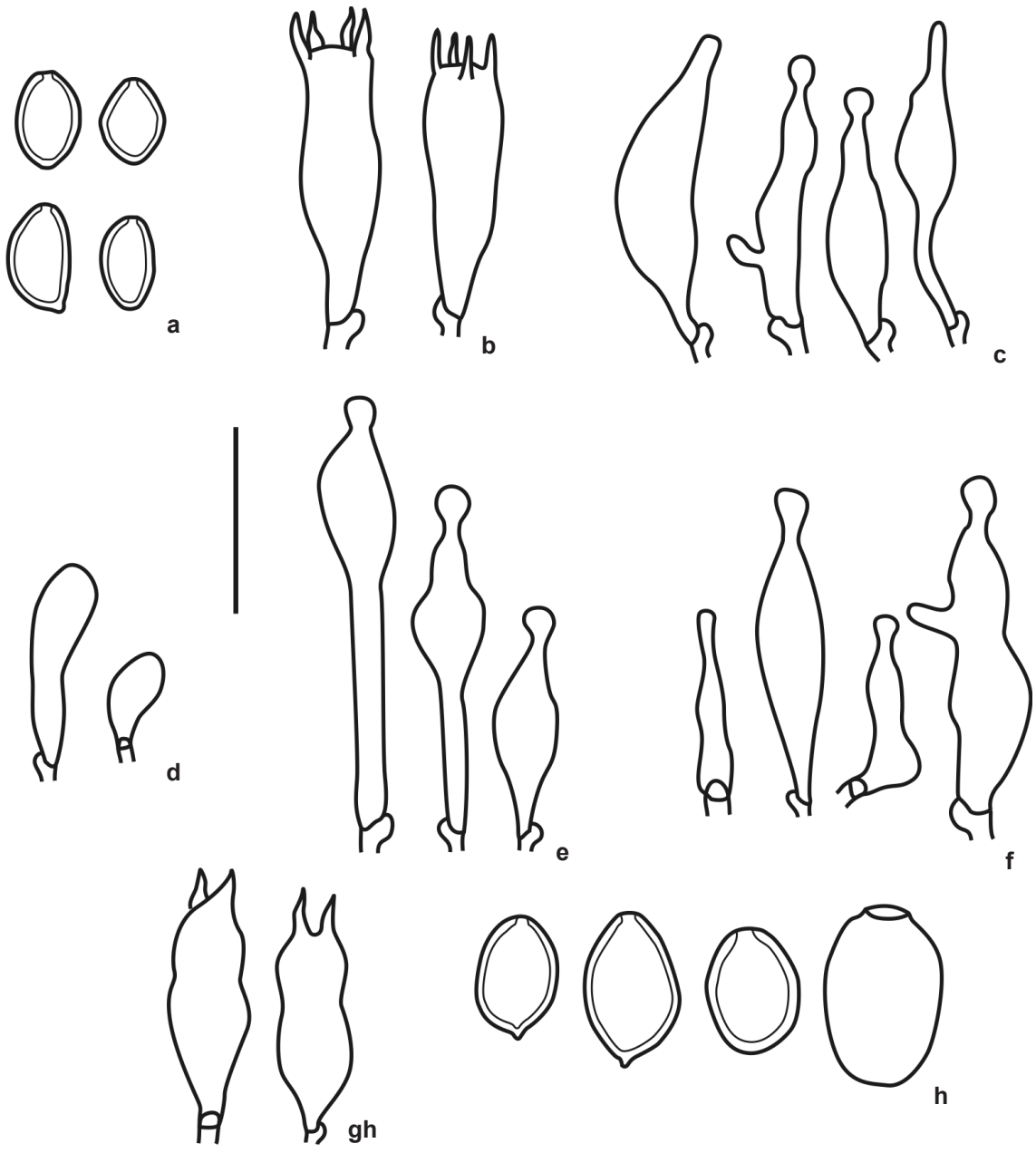


**Figure 6** – a-f. *A. pediades* var. *pediades* – a. basidiospores; b. basidia; c. cheilocystidia; d. pileipellis cell; e. pileocystidia; f. caulocystidia; g-h. *A. pediades* var. *bispora* – g. basidia; h. basidiospores. Scale bar = 20 μm.

Gregory 1981). On the other hand, Watling & Abraham (1986) considered *A. pediades* and *A. semiorbicularis* as two distinct species among which several "microspecies" could be recognized, but based on our macro- and microscopic observations, present morphological differences are not sufficient to recognize different species. In any case, there is a continuous variation and species boundaries are unclear among *A. pediades* var. *pediades* and *A. pediades* var. *bispora*. Despite this, based on observations of the Argentinean specimens, and for several authors in diverse parts of the world (Singer 1969; Moser 1978; Watling 1982; Malysheva & Kiyashko 2011), we consider *A. pediades* var. *bispora* as an independent taxon characterized by its subvicid pileus surface, a high percentage of 1–2-spored basidia, and larger spores. On the other hand, Nauta (2004, 2005) considered both varieties as the same taxon, *A. pediades* var. *pediades*, with a wide spore size range [(10.5)11.5–18.5(–20) × 7.5–12 (15.0) µm].

Geographical distribution: known form Europe (Singer 1969; Moser 1978; Watling 1982; Malysheva & Kiyashko 2011), Asia (Malysheva & Kiyashko 2011) and South America, where it was described from Argentina (Singer 1969). Habitat and substrate: on soil in grasslandsand roadsides in human disturbed places (Malysheva & Kiyashko 2011).

***Agrocybe pediades*** var. ***fimicola*** (Speg.) Nauta, Persoonia 18: 3, 429-433. 2004.
≡ ***Naucoria fimicola*** Speg., An. Mus. nac. Hist. nat. B. Aires 6: 133-134. 1899.
≡ ***Agrocybe fimicola*** (Speg.) Singer, Lilloa 23: 209. 1950.
= ***Agaricus cisneroi*** Speg., An. Soc. Cient. Arg. 10(3): 124. 1880.
= ***Naucoria cisneroi*** (Speg.) Sacc., Syll. Fung. 5: 846. 1887.
= ***Agrocybe coprophila*** Singer, Not. syst. Sect. crypt. Inst. bot. Acad. Sci. U.S.S.R. 5: 99. 1945.
**Material examined** ARGENTINA. CORRIENTES: Curuzú Cuatiá, 7.XI.1965, leg. *R. Singer S 565* (BAFC 30646). TUCUMÁN: Aconquija Park, San Javier hill, *ad humum*, 26.XII.1948, leg. *R. Singer T 53*; *in silva montano-subtropicali, gregarious,* 2.III.1949*,* leg. *R. Singer T 213* (LIL); San Pablo, *in campis Sacchari officinarum ad terram nudam*, 29.III.1949, leg. *R. Singer T 307 (*LIL); *ad marginem graminosum viae sub arboribus (Choricia), ad terram et frustulas gregario*, 1.I.1949, leg. *R. Singer T 69* (LIL); Avellaneda Park, *ad terram nudam sub arboribus*, 25.XII.1948, leg. *R. Singer T 61* (LIL). CÓRDOBA: 7.XII.1958, leg. *J.E. Wright* (LIL); De Oro valley, Alto de San Pedro, Huerta Grande, *ad margines viarum, gregatim*, 1.I.1949, leg. *R. Singer* (LIL).

*Agrocybe fimicola* (Speg.) Singer, originally described in Argentina by Spegazzini (1899), was reduced to the level of variety within *A. pediades* by Nauta (2004) because it is microscopically identical to the latter and presents few macroscopic differences, as the presence of a conspicuous appendiculate veil in the pileus margin, even when mature, and in the aerolate rimulose pileus surface at maturity.

Geographical distribution: known from Europe (Nauta 2004) and South America (Coimbra 2015), where it was described from Brazil (Watling 1992) and Argentina (Spegazzini 1899; Singer 1950). Habitat and substrate: in rain forest, grassland and coastal dunes, on dung and soil.

***Agrocybe perfecta*** (Rick) Singer, Lilloa 25: 323. 1952 (1951). Fig. 7a-e
≡ ***Pholiota platensis*** var. *perfecta* Rick, Brotéria, Bot. 6: 78. 1907.
≡ ***Pholiota vermiflua*** var. *perfecta* Rick, Lilloa 3: 402. 1938.

Pileus light yellowish to cream, with the center light chestnut to red chestnut, hygrophanous, subviscid in humid conditions, glabrous, smooth or mildly scrobiculate, convex then applanate, sometimes mildly umbonate, 20–70 mm diam.; margin entire, thin, incurved to plane, not striate. Lamellae grayish brown to ochraceous brown, edge with the same color, ventricose, free to finely annexed. Stipe grayish white to light chestnut, stuffed, smooth, cylindrical with a bulbose base, with abundant basal mycelia. Veil forming a superior, simple, cream color, permanent and well-developed annulus. Spore-print dark chestnut. Context fleshy, white, odor and taste unknown.

Basidiospores 9–14(–15) × (5.5–)6.5–8.5(–10) µm, Q= 1.56 (n= 60); ellipsoid to oblong, smooth, with thick double wall, olive brown, apically truncate with a germ-pore (Fig. 7a). Basidia 16–25 × 7–10 µm, clavate, hyaline, thin-walled, 4-spored, or less frequently 2-spored (Fig. 7b). Pleurocystidia 17–48 × 8–30 µm, vesiculose to piriform, without mucronate ápex, broadly rounded ápex, pedicellate, thin-walled, hyaline (Fig. 7c). Cheilocystidia 18–21 × 10–12 µm, vesiculose to obovoid, hyaline, thin-walled (Fig. 7d). Hyphae with clamp-connections. Hymenophoral trama subregular. Pileipellis hymeniform, constituted by vesicular-clavate cells 22–36 × 15–23 µm. with brownish pigments (Fig. 7e). Dermatocystidia not observed.

**Material examined**: ARGENTINA. TUCUMÁN: Alto de Taficillo, San Javier hill, *in silva montana alnea (Alnus jorullensis* var. *spachii) ad terram et folia relapsa,* 6.I.1950, leg. *R. Singer T 810* (LIL). Villa Luján, in manure under trees of the genus *Citrus*, gregarious, 6.I.1950, leg. *R. Singer T 3344* (LIL) (BAFC 31892). SALTA: Santa Victoria Oeste, Baritú National Park, midway between El Lipeo and Baritú (22°27'07,7''S 64°44'41''W), 22.IV.2009, leg. *Niveiro et al. 1055* (CTES).

This species is characterized by free lamellae, rough scrobiculate pileus surface, and vesiculose cheilocystidia (Singer & Digilio 1952; Warling 1992). Furthermore, it differs from *Agrocybe platensis* (Speg.) Singer for having slightly smaller basidiospores (9–13 × 6.5–8.5 µm in *A. perfecta* versus 11–14.5 × 7–8 µm in *A. platensis*) (Watling 1992). Another similar species is *A. puiggarii* (Speg.) Singer, which is distinguished by the presence of vesiculose mucronate pleurocystidia (Singer & Digilio 1952). Singer & Digilio (1952) distinguished *A. perfecta* f. *levis* Singer and *A. perfecta* f. *angustisperma* Singer, the former differs only by having smooth pileus surface rather than rough, and the latter exclusively differs by their narrower basidiospores and the attenuated apex (10.8–11.2 × 7 µm). We did not observed any distinctive features between the two forms proposed, thus we considered both as the same taxon. Anyway, of the two forms proposed by Singer & Digilio (1952) none have been validly published (Art. 38, Turland *et al.* 2018).

In the specimens analyzed, we found an overlap in the spore size between *A. perfecta* and *A. platensis,* however, the presence of free lamellae could be considered as a diagnostic character to separate both taxa. There is no doubt that a more exhaustive study is necessary to clarify the identity of these species unequivocally.

Geographical distribution: South America. Southern Brazil (Singer 1953; Watling 1992) and northwest Argentina (Singer & Digilio 1952). Habitat and substrate: subtropical rain forest, under bushes, on dung and soil.

***Agrocybe platensis*** (Speg.) Singer, Lilloa 25: 322. 1952 (1951). Fig. 8a-g
≡ ***Pholiota platensis*** Speg., An. Mus. nac. Hist. nat. B. Aires 6: 123-124. 1898.
≡ ***Pholiota vermiflua*** **var.** ***platensis*** (Speg.) Rick, Lilloa 3: 402. 1938.

Description based on dried material: Basidiospores 10–14.5(–16) × 7–9.5 µm, Q= 1.45 (n= 100), ellipsoid, smooth, with a thick double wall, rusty brown, apically truncate with a germ-pore (Fig. 8a). Basidia 18–22 × 9–10 µm, clavate, hyaline, thin-walled, 4-spored (Fig. 8b). Pleurocystidia 22.5–38 × 15–25 µm, pyriform, never with mucronate apex, thin-walled, hyaline (Fig. 8c). Cheilocystidia 35–62 × 8–17 µm, ventricose or with a constriction in the middle, sometimes another under the subcapitate apex, generally mucronate, sometimes with two mucrons, some as pleurocystidia, thin-walled, hyaline (Fig. 8d). Hyphae with clamp-

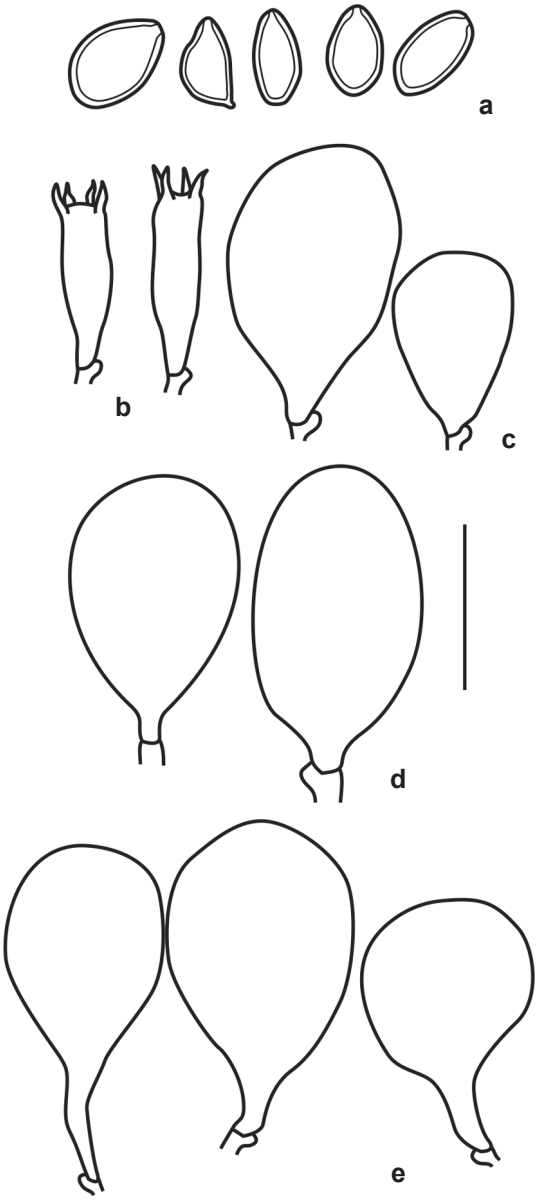


**Figure 7** – *Agrocybe perfecta* – a. basidiospores; b. basidia; c. pleurocystidia; d. cheilocystidia; e. pileipellis cell. Scale bar: A-D = 20 µm.

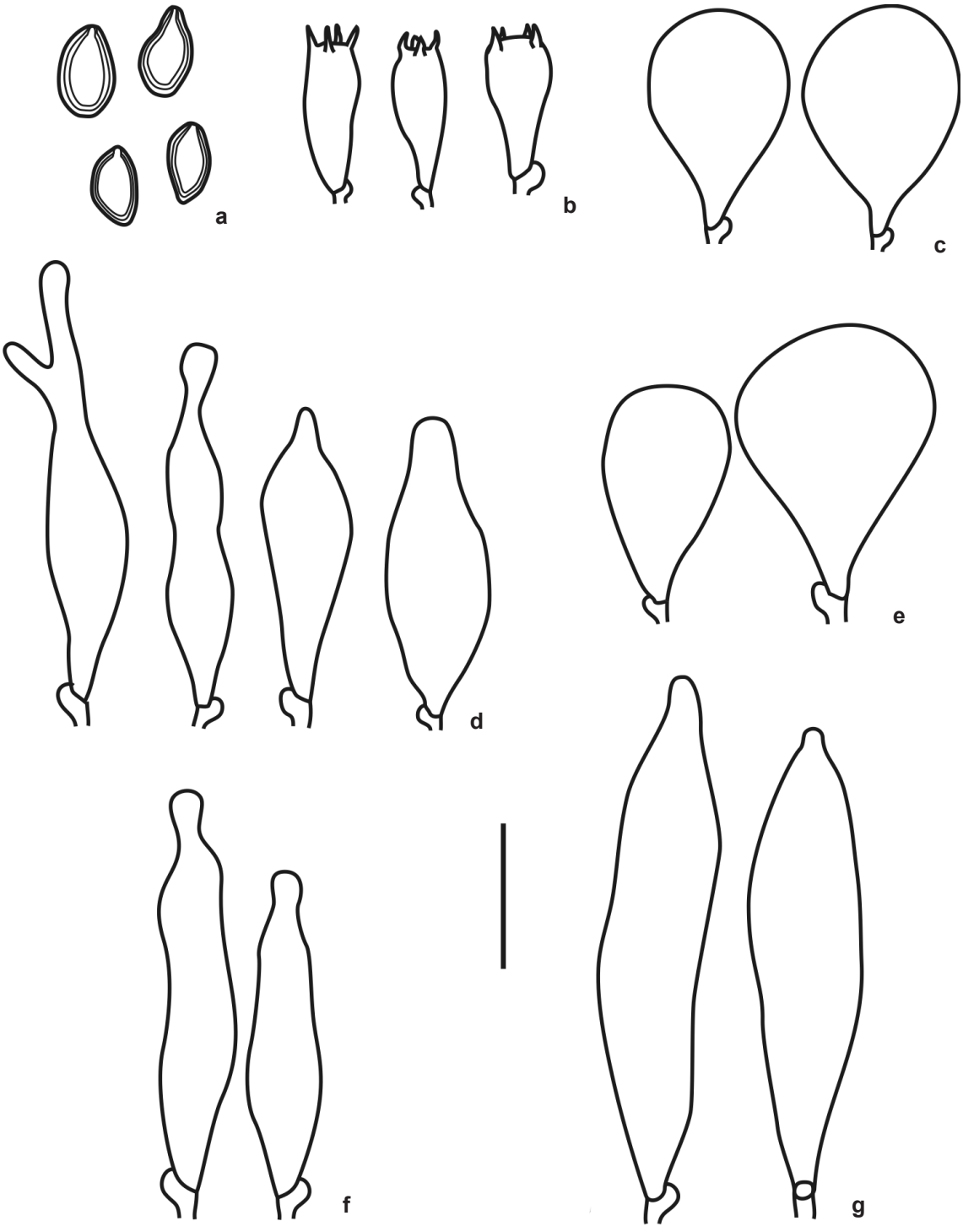


**Figure 8** – *Agrocybe platensis* – a. basidiospores; b. basidia; c. pleurocystidia; d. cheilocystidia; e. pileipellis cell; f. pileocystidia; g. caulocystidia. Scale bar = 20 μm.

connections. Pileipellis hymeniform, constituted by vesicular-clavate cells 27.5–55 × 15–40 μm (Fig. 8e). Pileocystidia (Fig. 8f) and caulocystidia (Fig. 8g) similar to cheilocystidia, but longer, 75–80 × 11–15 μm.

**Material examined**: ARGENTINA. TUCUMÁN: Salí river, near La Aguadita, *in pratis apricis inter herbas altas,* 24.II.1951, leg. *R. Singer T 1326* (LIL); *ipse* T 1325 (LIL) (the material is in poor condition). Anta Muerta, San Javier hill, 1100 m above sea level, *inter sanchos in pascuis montanis apricis*, 20.X.1949, leg. *R. Singer & A. Digilio T 712* (LIL); Aconquija Park, *ad saxa lapidesque torrent sicc.* 800 masl, 19.XII.1948, leg. *R. Singer T 49* (LIL); Lules gully, *ad ripam torrentis inter gramina loco subaprico in terra sabulosa solitario*, 27.1.1951, leg. *R. Singer T 1121* (LIL); Cochuna river valley, 10 km east of Las Lenguas, 20.II.1951, leg. *R. Singer T 1303* (LIL).

Singer & Digilio (1952) described this species in the fresh state. Pileus yellowish brown but soon clearing up white or yellow (Maerz & Paul 11-H-5) with the margin sometimes "Khaki" (Maerz & Paul 13-J-7), or "Pond Lily" (Maerz & Paul 10-I-4) or "Chinese Yellow" (Maerz & Paul 11-L-4), occasionally with patches "Raw Amber" (Maerz & Paul 15-L-12) when wet, brown to ochre chestnut according to Raithelhuber (1974); not hygrophanous, viscid when very young and fresh, then sub-viscid to dry, and often something bright, smooth, but the surface in many specimens splitting and becoming irregularly rimose; campanulate hemispherical, soon convex, then flattened and often with a depressed center, with or without a small umbo, 65–95 mm diam, margin not striated, sometimes transparently striated in old specimens. Lamellae hazel-chestnut to brownish-clay, "Isabela" (Maerz & Paul 13-K-7) to (Maerz & Paul 13-H-6), moderately broad, close, subemarginate to rounded annexed. Stipe white, only in too old specimens concolorous with the pileus, sub-fibrillose apex, the remaining glabrous or slightly scaly, solid, equal or more often tapering upwards, sometimes downwards, rarely with a slight bulb, 40–100 × 6–10 mm; white tomentose basal mycelium, with numerous white rhizomorphs. Veil well developed, forming a membranous annulus, thin, apical, 24 mm diam, sometimes lacerated and then a part of the veil beings on the margin of the pileus. Spore-print rusty brown. Context white, unchanging, fleshy. Odor slightly farinaceous, taste mild or slightly astringent, never bitter but something farinaceous. Generally solitary but sometimes densely gregarious (Singer & Digilio 1952).

*Agrocybe platensis* is similar to *A. dura*, but differs from the latter because *A. platensis* has a whitish pileus, absence of mucronate pleurocystidia and closer adnexed lamellae (Singer & Digilio 1952).

Geographical distribution: Northwestern and central Argentina and Chile (Singer & Digilio 1952). Habitat and substrate: in open places, on rich soils.

***Agrocybe praecox*** (Pers.) Fayod, Annls Sci. nat., Bot., ser. 7, 9: 358. 1889. Fig. 9a-e

Description based on dried material: Basidiospores 7–11.5 × 5–8 μm, Q= 1.4 (n= 60), ellipsoid, smooth, with a thick double wall, yellowish-brown, apically truncate with a germ-pore (Fig. 9a). Basidia 21–27 × 6–8 μm, clavate, hyaline, thin-walled, frequently 4-spored, less frequently 3- or 2-spored (Fig. 9b). Pleurocystidia 33–65 × 15–24 μm, fusiform, lageniform, vesiculose or rostrate, thin-walled, hyaline (Fig. 9c). Cheilocystidia 27–45 × 10–20 μm, similar to pleurocystidia. Hyphae with clamp-connections. Pileipellis hymeniform, constituted by vesicular-clavate cells, 17–27 × 12–18 μm, (Fig. 9d). Pileocystidia not observed. Caulocysitidia (13–)18–22 × 4–7 μm, clavate to lecytiform (Fig. 9e).

**Material examined**: ARGENTINA. RÍO NEGRO: Frías lake, *loco aprico inter plantagimen,* 18.II.1964, leg. *Singer M 4019* (BAFC 31890). TIERRA DEL FUEGO: Dpto. Ushuaia, Pto. Harbeton, woods near the cementery, 16.III.1973, leg. *M. Shanly 23* (BAFC 23252). TUCUMÁN: Tafí del Valle, *in prato montano*, 17.I.1950, leg. *R. Singer T 901* (LIL).

Horak (1980) described fresh specimens as follows: Pileus white to yellow, becoming pale brownish yellow with age, or ivory white to cream, darker in the center, subviscid when moist, glabrous, wrinkled, in mature and dried basidiomata with tearing cuticle, striated margin, occasionally appendiculate by the remnants of the veil, convex to umbonate, 20–60 mm diam (Horak 1980), rarely up to 140 mm (Watling 1982). Lamellae whitish becoming clay-coloured or pale brown hazel, with fimbriate white edge, ventricose, crowded, annexed or broadly adnate to subdecurrent with short teeth. Stipe white, becoming pale brown in aged specimens, cylindrical to sub-clavate, equal or widening towards the base, 40–100 × 6–10 mm. Veil forming a white pendant annulus, membranous, apical). Spore-print chestnut. Context whitish in the pileus, brownish in the stipe; Odor farinaceous, taste bitter. Solitary or gregarious. Fruiting all year, edible (Phillips 1981).

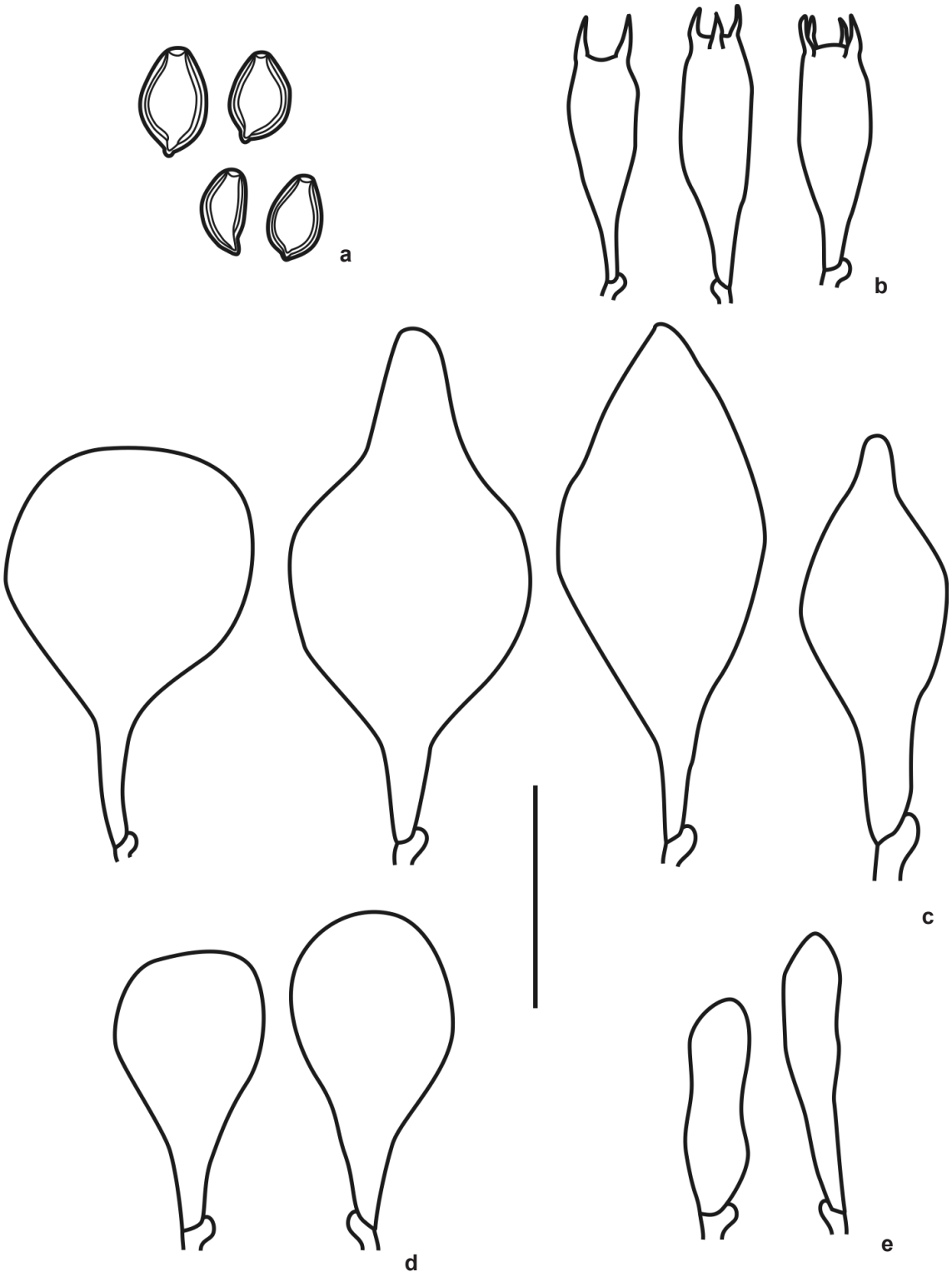


**Figure 9** – *Agrocybe praecox* – a. basidiospores; b. basidia; c. pleurocystidia; d. pileipellis cell; e. caulocystidia. Scale bar = 20 μm.

This species is recognized by its habitat, well-developed annulus, and small basidiospores. Given the wide variety of the basidiospores sizes described by different authors, likely *A. praecox* includes two or more morphologically similar species (Watling 1982). In fact, Flynn & Miller (1990) found four morphologically indistinguishable biological species after performing sexual compatibility and morphological studies to investigate the *A. praecox* complex. These authors concluded that the spore size and the macromorphology are not diagnostic characters to recognize species within this complex. However, ecological and habitat characteristics and geographical origin are more useful for this purpose (Flynn & Miller 1990).

*Agrocybe molesta* (Lasch) Singer is another species of sect. *Agrocybe* that has often been confused with *A. praecox* (Flynn & Miller 1990). *Agrocybe molesta* differs from the *A. praecox* complex by the spore size (7–11.5 × 5–8 μm in *A. praecox* and 11–14 × 7–8 μm in *A. molesta*, ss. Watling 1982) and is restricted to grasses as substrate, while the four biological species of the group *A. praecox* are able to degrade also fragmented wood, branches and forest debris (Flynn & Miller 1990). *Agrocybe molesta* was also recognized as another biological species according to sexual compatibility studies (Flynn & Miller 1990).

Geographical distribution: Worldwide distribution (Singer 1969; Malençon & Bertault 1970; Watling 1982). In South America reported from Colombia, Venezuela, Brazil, Chile and Argentina (Coimbra 2015). Known from central and south Argentina (Singer 1969; Horak 1980). Habitat and substrate: in fields and forests, above ground, in the grass.

***Agrocybe puiggarii*** (Speg.) Singer, Lilloa 23: 212. 1950. Fig. 10a-e

≡ ***Pholiota puiggarii*** Speg., Boln Acad. Nac. Cienc. Córdoba 11 (4): 413. 1889.

= ***Pholiota puiggariana*** Rick, Brotéria, Bot. 6: 77. 1907.

Description based on dried material: Basidiospores (10–)11–14.5(–16) × (5–)6–8(–9) μm, Q= 1.72 (n= 40), cylindrical, some throttled in the middle or ellipsoid-oblong, never rhomboid, smooth, with double wall, ochraceous brown, apically truncate with a germ-pore, some rare basidiospores reaching 25 × 8 μm (Fig. 10a). Basidia 22–30 × 7–11 μm, clavate, hyaline, thin-walled, 4-spored (Fig. 10b). Pleurocystidia 45–71 × 17–26 μm, clavate to vesiculose, with rostrato to papilate apex, hyaline (Fig. 10c). Cheilocystidia not observed. Hyphae with clamp-connections. Hymonophoral trama regular. Pileipellis hymeniform, constituted by vesicular-clavate cells, 25–28 × 13–17 μm, (Fig. 10d). Pileocystidia 50–70 × 28–29 μm, clavate, with rounded apex (Fig. 10e). Caulocysitidia not observed.

**Material examined**: ARGENTINA. TUCUMÁN: Los Sosas river, Indio Monument, on humus, in *Boehmeria caudate* scrub, 26.II.1949, leg. *R. Singer T 158* (LIL); Aconquija Park, San Javier hill, *ad terram in silva montano-subtropicali*, 17.IV.1949, leg. *R. Singer T 455* (LIL).

Singer & Digilio (1952) described fresh specimens as follows: Pileus "Honeysweet" (Maerz & Paul 11-J-6) or "Maise" (Maerz & Paul 10-G-5), ocher to yellowish-brown (Raithelhuber 1988), evenly coloured, later with paler margin, slightly viscid when wet, glabrous, smooth, often reticulate-rough, campanulate convex, then convex, often eventually flattened with slightly depressed center, but not umbonate, 30–50 mm diam. Lamellae clay colored in mature specimens, "Tanaura" (Maerz & Paul 12-D-4), narrow to moderately wide, from crowded to close, sinuate or closely annexed, never completely free. Stipe white, quickly becoming cinnamon color, with whitish fibrils, glabrous, fistulose, equal or slightly tapering upward or with enlarged apex, always with bulbous to subbulbous base (10 mm diam.), 60–120 × 3–4 mm. Basal mycelium tomentose, white, abundant; with numerous white rhizomorphs. Veil forming a membranous, persistent, white, apical, wide annulus. Context white, unchanging, rather thick, fleshy. In summer and autumn (Singer & Digilio 1952).

Singer & Digilio (1952) described cystidia as ampullaceous, vesiculose in mature specimens, rarely with two parallel mucrons. They did not specified the location of the described cystidia, but in base to the specimens examined by us, and considering that we did not find cheilocystidia, we assume that the cystidia described by Singer & Digilio (1952) correspond to pleurocystidia. Singer & Digilio (1952) also described some 2-spored basidia, which were not observed in this study, probably due to the age of the studied material. This species resembles *A. alachuana* (Murrill) Singer that in both species the pileus is rough and the stipe becomes brown, and by the characterized habit and habitat, on decay wood inside the forest (Singer &

Digilio 1952). *Agrocybe alachuana* has narrower basidiospores, (5–)6–6.5 μm diam (Singer 1977) and the color of the pileus with pink to orange tones (Singer & Digilio 1952).

Geographical distribution: South America. Reported from southern Brazil (Spegazzini 1889) and north of Argentina (Singer & Digilio 1952; Raithelhuber 2004). Habitat and substrate: inside the forest, on ground between herbs, and on decaying wood.

***Agrocybe retigera*** (Speg.) Singer, Lilloa 23: 213. 1950. Fig. 11a-d
≡ ***Naucoria retigera*** Speg., An. Mus. nac. Hist. nat. B. Aires 31: 363-364. 1922.

Description based on dried material: Basidiospores 11.5–18(–23) × (6–)7–10(–11) μm, Q= 1.72 (n= 20), oblong, smooth, with a double wall, yellowish-brown, apically truncate with a broad germ-pore (Fig. 11a). Basidia 27.5–32.5 × 11.25–12.5 μm, clavate, hyaline, thin-walled,

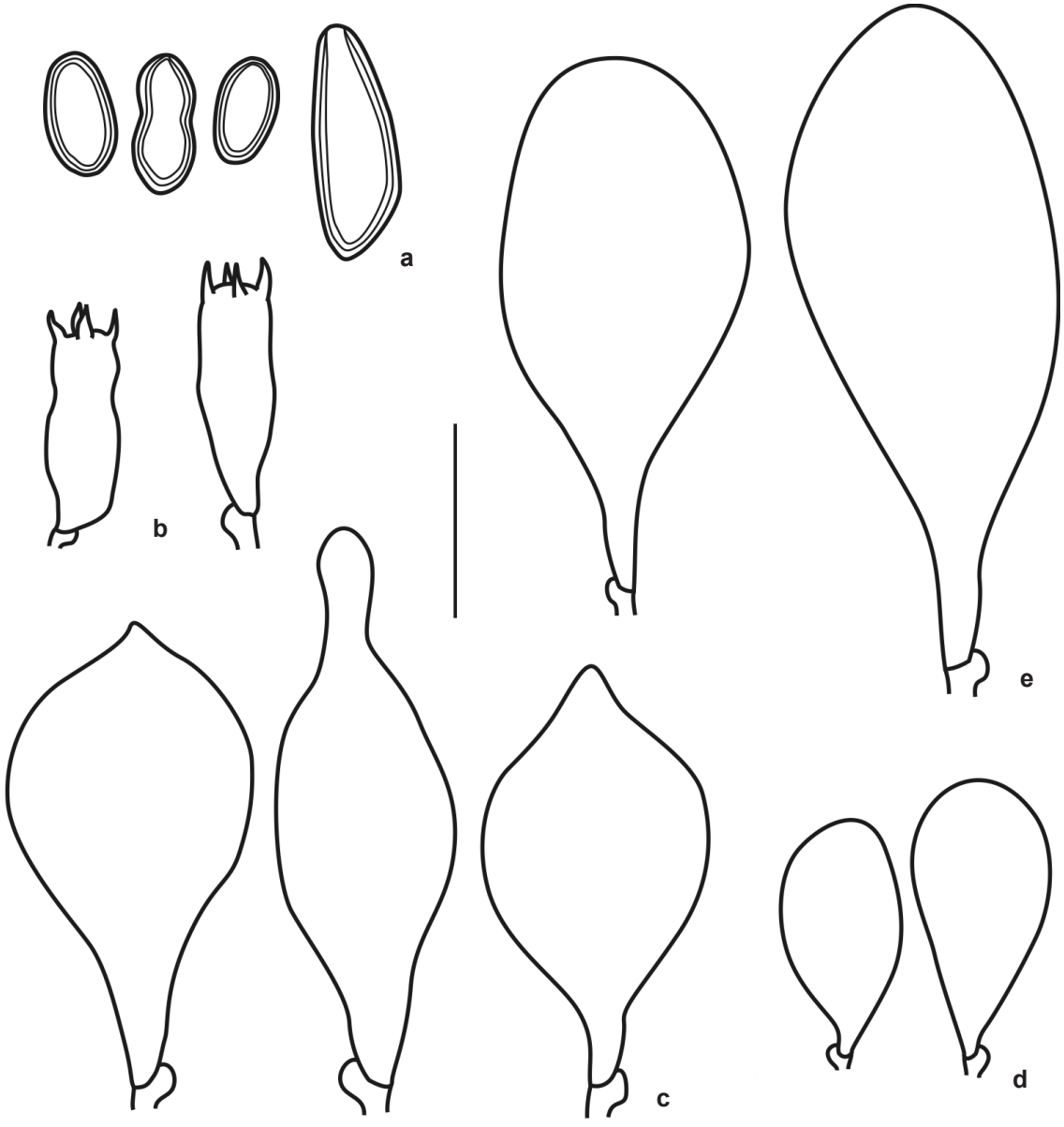


**Figure 10** – *Agrocybe puiggarii* – a. basidiospores; b. basidia; c. pleurocystidia; d. pileipellis cell; e. pileocystidia. Scale bar = 20 μm.

frequently 4-spored, less frequently 2-spored (Fig. 11b). Pleurocystidia 35–40 × 18–25 μm, pyriform, thin-walled (Fig. 11c). Cheilocystidia not observed. Pileipellis cells, in poor condition. Caulocysitidia 32.5 × 10 μm, lageniform (Fig. 11d).

**Material examined**: ARGENTINA. TUCUMÁN: Marcos Paz, *ad marginem campi Sacchari off. e terra masc,* XII.1954, leg. *R. Singer T 2016* (LIL).

This species is characterized by the lacunose-rugose pileus surface (or at least at the margin), large basidiospores, and cheilocystidia and pleurocystidia vesiculose with a broadly rounded apex (Spegazzini 1922; Singer 1950). In the material studied in the present work, cheilocystidia were not found, this could be due to the age of the material. The basidiospores-sizes of this collection matches to the material type of the species described by Singer (1950). There is no macroscopic description based on Argentinean materials, so it is not presented. A detailed macroscopic description can be observed in Cortez & Silveira (2005) based on Brazilian collections.

Geographical distribution: Pantropical. Described originally from Paraguay as *Naucoria retigera* (Spegazzini 1922) and later know from Florida (USA) to north Argentina (Singer 1950), Brazil (Cortez & Silveira 2005), and India (Watling & Abraham 1986). Habitat and substrate: above ground.

***Agrocybe tucumana*** (Singer) Watling, Bibl. mycol. 82: 63. 1981. Fig. 12 a-e

≡ ***Agrocybe firma*** var. ***tucumana*** Singer. Mycologia 51: 398. 1959.

≡ ***Agrocybe tucumana*** Singer, Sydowia Beih. 7: 76. 1973. Invalid name.

Description based on dried material: Basidiospores 7–8 × 4–6 μm, Q= 1.54 (n= 20), ellipsoid, smooth, ocher, with a tiny germ-pore, or without any apical discontinuity (Fig. 12a). Basidia 26.5–34.5 × 5–7.3 μm, clavate, thin-walled, hyaline, frequently 4-spored, less frequently 2-spored (Fig. 12b). Pleurocystidia (25–)35–40 × 10–12(–17) μm, vesiculose, with a very wide rounded apex (10 μm diam.), thin-walled, scarce

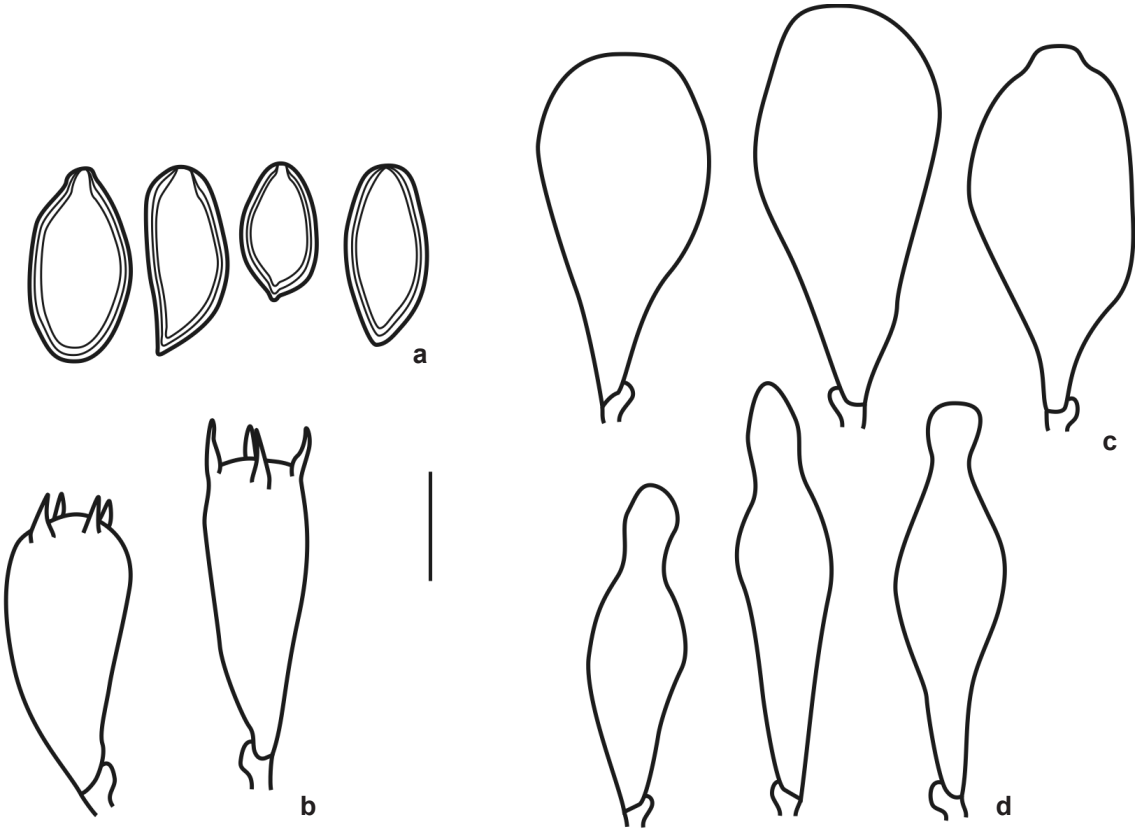


**Figure 11** - *Agrocybe retigera* – a. basidiospores; b. basidia; c. pleurocystidia; d. caulocystidia. Scale bar = 20 μm.

(Fig. 12c). Cheilocystidia absent. Hyphae with clamp-connections. Hymenophoral trama regular. Pileipellis hymeniform, constituted by vesicular-clavate cells, 13–15 × 12–14 μm hyaline to yellowish (Fig. 12d). Pileocystidia not observed. Caulocysitidia 30–55 × 9–15 μm ventricose to clavate (Fig. 12e).

**Material examined**: ARGENTINA. TUCUMÁN: Los Sosas river, at 1000 m of altitude, humus under dead root in subtropical forest, 4.II.1955, leg. *R. Singer T 2130*, *Typus* (LIL).

Singer (1959) described fresh specimens: Pileus coffee in the center (Maerz & Paul 15-A-11), margin pale brownish cream ("Leghorn", Maerz & Paul 10-D-3), not more hygrophanous than *C. cylindracea*, glabrous, weakly rugose-sulcate, convex with depressed center, 22–23 mm broad. Lamellae "bronze" (Maerz & Paul 14-L-9), broad, distant, adnate. Stipe much paler than the pileus, apex sordid white, fibrillose, subequal or with a thicker base, 38 × 3–5 mm. Veil indistinct, annulus absent. Spore-print "clove" (Maerz & Paul 15-C-12). Context white or off-white. Odor and taste indistinct.

Singer (1973) raised *A. firma* var. *tucumana* to species level, but omitted the basionym; latter Watling (1981) proposed the correct combination. This South American species differs from *A. firma* (Peck) Singer by the absence of cheilocystidia and by the ventricose to claviform caulocystidia, which differ from the longer, lageniform caulocystidia described in *A. firma* (Nauta 2005).

Geographical distribution: South America. Northwest Argentina (Singer 1959, 1973; Raithelhuber 2004) and Brazil (Meijer 2006; Coimbra 2015). Habitat and substrate: humus.

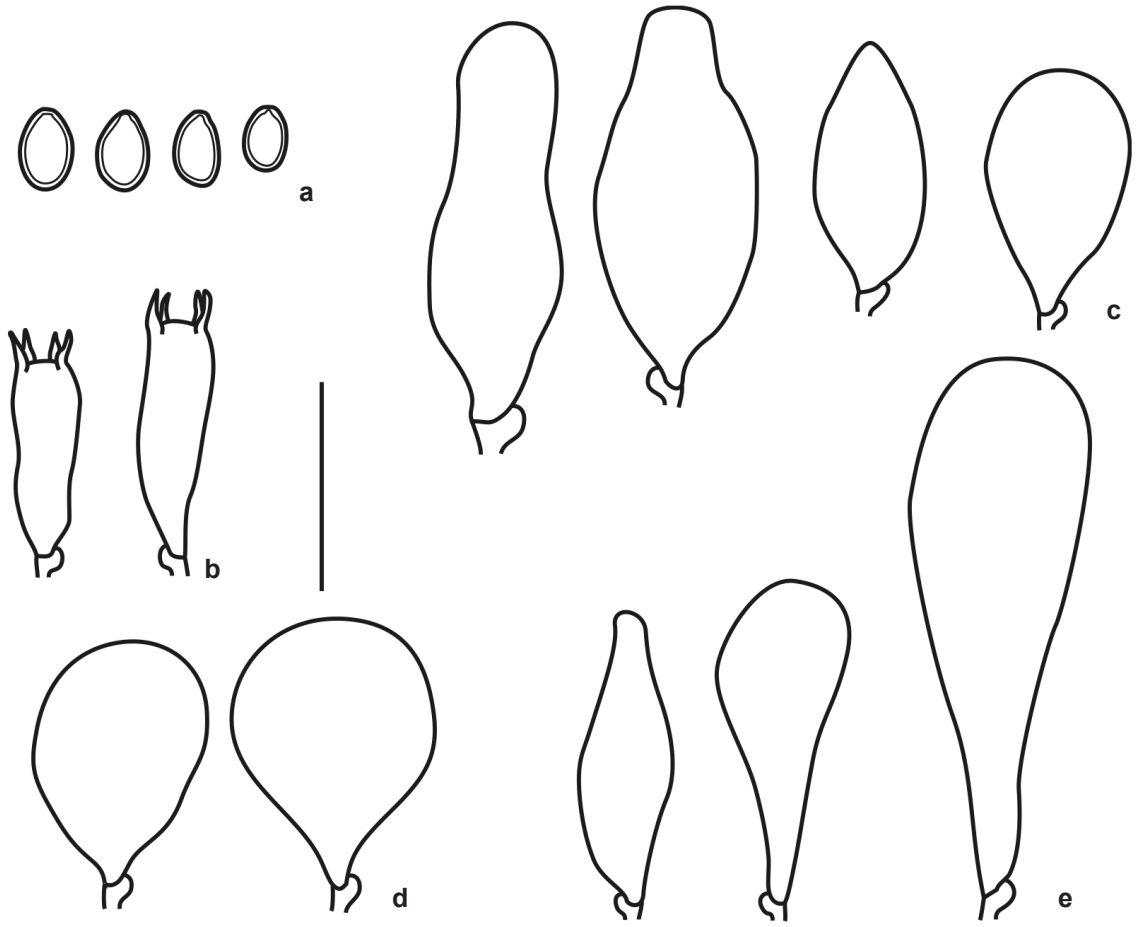


**Figure 12** – *Agrocybe tucumana* – a. basidiospores; b. basidia; c. pleurocystidia; d. pileipellis cell; e. caulocystidia. Scale bar = 20 μm.

***Agrocybe xerophytica*** Singer, Mycologia 51: 399. 1959. Fig. 13 a-d

Description based on dried material: Basidiospores 7–9.5(–11.5) × 5–6(–7) μm, Q= 1.5 (n= 20), ellipsoid, smooth, ochraceous-brown, with a tiny germ-pore, or without any apical discontinuity (Fig. 13a). Basidia 22–30 × (5–)6–7(–8) μm, clavate, thin-walled, hyaline, frequently 4-spored, less frequently 2-spored (Fig. 13b). Sclerotized basidia apparently sterile (Fig. 13c). Pleurocystidia and cheilocystidia not observed. Hyphae with clamp-connections. Hymenophoral trama regular. Pileipellis hymeniform, constituted by vesicular-clavate cells, 25–35 × 13–15(–21) μm, with brownish pigment (Fig. 13d). Dermatocystidia not observed.

**Material examined**: ARGENTINA. TUCUMÁN: near to San Pedro de Colalao, in the dry, sandy bed of a river, in the shadow of legumes and other subxerofitic mountain forest trees, growing separately but in large populations, 21.I.1955, leg. *R. Singer T 2053*, *Typus* (LIL), (BAFC 30656).

Singer (1959) described this species in the fresh state. Pileus ochraceous brown (center "Yucatán", Maerz & Paul 12-L-9, margin "Samovar", Maerz & Paul 12-K-7), not hygrophanous, not viscid, glabrous, smooth, eventually rivulose-rimulose in some specimens but usually with entire surface, not sulcate or striate, convex, then flat, subumbonate, 8–20 mm diam. Lamellae argillaceous brown, broad, subclose to subdistant, sinuate-adnexed, later adnate. Stipe white to pale buffish, mealy, then fibrillose, solid, equal, 12–20 × 1.2–3.8 mm. Veil fleeting, only as a white pubescence in very young specimens margin. Sopre-print rust brown. Context white to whitish. Odor and taste indistinct.

The cystidia described by Singer (1959) could not be observed in this study, probably due to the poor condition of the material: pleurocystidia 36–39 × 5.3–9.3 μm, cylindrical to ampullaceous, thin walled, scattered; cheilocystidia 24.7–30 × 3.3–7.3 μm, fusoid to ampullaceous, the apical part very thin (1.7 μm diam.) and obtuse to acute, sometimes with some inconspicuous cristal-line incrustation at the apex, thin-walled, hyaline, not forming an heteromorphous edge since they are interrupted by numerous basidia. Dermatocystidia similar to cheilocystidia but with a pointed apical excrescence.

Geographical distribution: Northwest Argentina (Singer 1959). Habitat and substrate: on sandy soils.

***Cyclocybe cylindracea*** (DC.) Vizzini & Angelini, in Vizzini, Index Fungorum 154: 1.2014.
≡ ***Agaricus cylindraceus*** DC., Flore française 6: 51. 1815.
≡ ***Agrocybe cylindracea*** (DC.) Maire, Mém. Soc. Sci. Nat. Maroc 45: 106. 1937.
= ***Agrocybe aegerita*** (V. Brig.) Fayod, Ann. Sci. Nat. Bot., Ser. 7, 9: 358. 1889.

Pileus brown, generally darker in the center and almost white in the margin, uniform dark brown in primordia, not hygrophanous, not viscid, glabrous, eventually sulcate or striate in some specimens but usually smooth and silky; convex to flat, 8–200 mm broad. Lamellae white, light grey and eventually strong brown or dark brown,

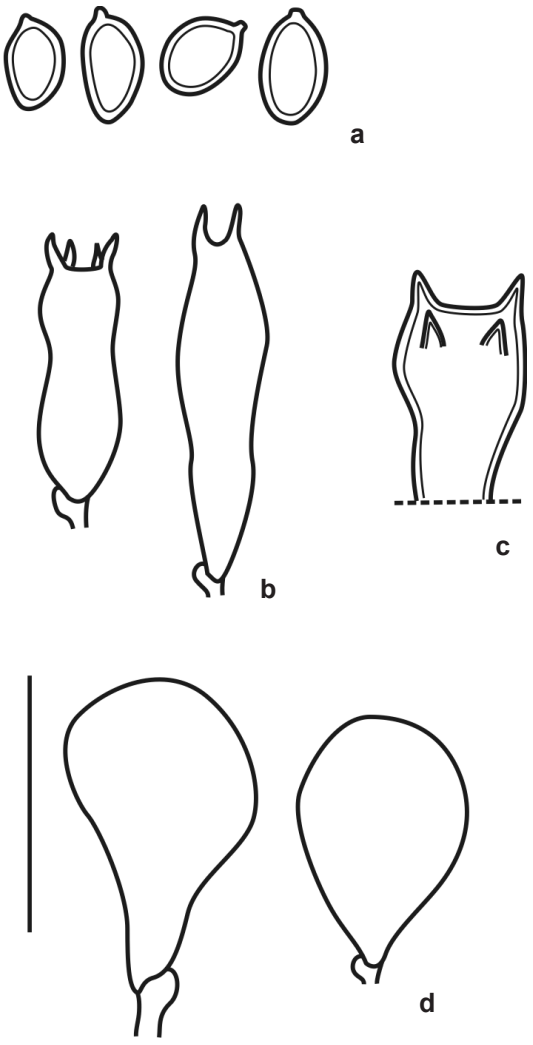


**Figure 13** – *Agrocybe xerophytica* – a:.basidiospores; b. basidia; c. sclerotized basidia; d. pileipellis cell. Scale bar = 20 μm.

moderately broad, tight, adnated, sinuated, or subdecurrent, edge smooth or crenate. Stipe white to very pale brown, with scales to fibrillose, cylindrical, solid, 10–150 × 2–25 mm. Veil forming a broad and persistent ring. Spore-print strong brown. Context white. Odour and taste pleasant, fruity. Gregarious.

Basidiospores (8–)9–16(–17) × 5–9(–10) µm, Q = 1,8 (n = 700), oblong, smooth, some with and other without oil-like droplets, pigmented (honey colored or chestnut-brown) with a small never truncated germ pore. Basidia (17–)22–46 × 5–8 µm, clavate, most middle constrained, thin walled, hyaline, 1- to 4-spored. Pleurocystidia (18–)21–65 × (5–)7–17 µm, clavate to ventricose, with rounded apex or mucronated or capitated, thin walled, numerous. Cheilocystidia 18–49 × (3–)5–13 µm, similar to pleurocystidia or smaller and then cylindrical to lageniform. Hyphae with clamp-connections. Pileipellis of the pileus formed by vesicular to clavate elements, 14–42 × 6–25 µm forming a hymeniphorm layer. Pileocystidia 17–55 × (5–)6–13 µm, ventricose and mucronate, sometimes with two constrictions near the apex or lageniform, rarely acute. Caulocysidia 16–88(–95) × 4–16 µm, similar in shape to the cheilocysitidia or capitate or mucronate and sometimes middle constrained.

**Material examined**: ARGENTINA. BUENOS AIRES: La Plata, *Ad truncum,* 26.IV.1951, leg. *J.C. Lindquist & J.E. Wright* (LIL); Punta Lara, at the base of a tree, 3.I.1951, leg. *Lindquist & Wright* (BAFC 50901); Chascomús, Bishop's house, on live louquat tree, 11.II.1998, leg. *E. Albertó* (BAFC 50118). CAPITAL FEDERAL: on *Populus sp*., 22.XI.1995, leg. *M. Bolontrade & E. Albertó* (BAFC 51590). ENTRE RÍOS: Concordia, Salto Grande, on *Ocotea acutifolia* trunk, 13.III.1973, leg. *Vicari & Rovetta* (BAFC 22763). SALTA: Cafayate, growing on living willow, 16.II.1955, leg. *K.J. Hayard* (LIL). CÓRDOBA: Córdoba Capital, La carolina, on *Acer negundo*, 16.XI.1985, leg. *A.T. Hunziker* (BAFC 30573). TUCUMÁN: Los Sosas river, *Ad truncum Allophylus edulis,* 26.II.1952, leg. *R. Singer T 1875* (LIL).

We have previously published a detailed morphological study of this species (Uhart & Albertó 2007). Fifty-two collections of *C. cylindracea* from distant world geographic origins were studied with the aim of defining all the variable morphologic characters and to determine if these collections could be considered as one species or if *C. cylindracea* included more than one taxon from a morphological perspective. We concluded that this species has two morphotypes: 2-spored and 1- to 4-spored. The former contains mostly 2-spored basidia and basidiospores 10–16(–17) × 5–9(–10) µm. The latter contains variable percentages of 1-, 2-, 3- and 4-spored basidia or mostly 4-spored basidia and smaller basidiospores, (8–)9–11 × 5–6 µm. The 2-spored morphotype includes collections exclusively from South America and Asia; the 1- to 4-spored morphotype contains specimens from Central- and South America, Europe, and Asia. A complete list of synonyms of *C. cylindracea* recorded in literature can be found in Uhart & Albertó (2007). Later on, we carried out mating compatibility tests among seven collections of *C. cylindracea* from distant geographic origins with the aim of determining if it includes one or more taxa from a biological perspective. Mating tests evidenced inter-fertility of Asian, American and European strains and the inter-sterility of one Argentinean strain (WT-54, Uhart & Albertó 2009). These results, in addition to mitochondrial small subunit variable domains phylogeny (Uhart *et al*. 2007) and morphological data (Uhart & Albertó 2007), lead us to consider the WT-54 strain as a novel species, *C. wrightii* (see below).

Geographical distribution: Cosmopolitan (Watling 1992). Habitat and substrate: lignicolous, on trunks of living or dead trees, often in wounds on the bases of the branches. Most commonly on *Populus, Salix*, *Quercus*, *Ulmus*, *Acer*, *Melia*, *Robinina*, *Broussonetia*, *Allophylus*, *Cupania*, *Phebe* (Singer 1950; Singer & Digilio 1952; Wright & Albertó 2002) and *Araucaria angustifolia* (Watling 1992).

***Cyclocybe wrightii*** (Uhart & Albertó) Uhart, Niveiro & Albertó, **comb. nov**.
≡ ***Agrocybe wrightii*** Uhart & Albertó, Mycol. Progr. 8(4): 344. 2009.
MB#: MB 828319

Pileus pale yellow at the centre, cream to white at the margin, primordia chestnut-orange; surface non-hygrophanous, not viscid, glabrous, smooth and silky; convex, later plane-convex, 5–56 mm diam. Lamellae white, then pale chestnut color, crowded, adnexed, smooth margin. Stipe pale yellowish, fibrillose, with scales, solid, 10–80 × 2–7 mm. Veil forming a persistent annulus in some specimens and/or leaving residues at the pileus margin, often not persistent. Spore-print ferrugineus brown. Context cremeus-white, odorless.

Basidiospores (7–)9–10(–11) × 5–6(–7) µm, Q=1.7 (n=30), oblong, smooth, pigmented

(ochraceus-brown, honey coloured), germ pore diminutive, with abundant oil droplets on fresh material. Basida 27–37(–47) × 6–9 µm (n= 20), claviform, generally middle constrained, thin walled, hyaline, more frequently 4-spored (50 %) than 3-spored (38 %) or 2-spored (12%). Pleurocystidia (22–)32–45×9–13 µm, ventricose to lageniform, some mucronate, thin walled, abundant. Cheilocystidia 23–27(–30) ×7–10 µm, ventricose to lageniform or fusoid, thin walled, hyaline. Hyphae with clamp connections. Pileipellis of the pileus formed by cylindrical cells, vesiculose or clavate (18–)25–37×7–18 µm forming a himeniforme layer. Dermatocystida absent.

**Material examined**: ARGENTINA. MISIONES: Urugua-i Provincial Reserve, 26.V.2001, leg. *E. Albertó & R. Petersen* (BAFC 51594) Type; basidiomes obtained in culture from the strain WT-54, 2005, leg. *M. Uhart* (BAFC 51611); (BAFC 51612); (BAFC 51613).

This species is characterized by the ochraceous yellowish pileus surface, up to 60 mm diam, the oblong basidiospores with a diminutive germ-pore and absence of dermatocystidia (Uhart & Albertó 2009). These morphological differences distinguish *C. wrightii* from *C. cylindracea*, such as the lighter color of the pileus in *C. wrigthii*, nevertheless, we consider the use of mtSSU variable domains sequences or inter fertility studies are important to distinguish them unambiguously (Uhart *et al*. 2007, 2009).

Recently Vizzini *et al.* (2014) evidenced the polyphyly of the genus *Agrocybe* using molecular data (LSU and ITS sequences analysis). Based on their dendrogram, they transfered two *Agrocybe* species, *A. erebia* and *A. cylindracea* sensu lato to the genus *Cyclocybe*. Considering that *A. wrightii* is undoubtedly very close to *C. cylindraceae* by morphological and molecular characters, we consider that *A. wrightii* should also be transferred to the genus *Cyclocybe,* and we propose here the new combination *C. wrightii*.

Althought *C. wrightii* molecular markers had been studied (mtSSU variable domains in Uhart *et al.* (2007)) and its phylogenetic relationship with *C. cylindracea* was deeply discussed (*C. wrightii* as group V strain, and *C. cylindracea* as the other groups), further molecular studies of *C. wrightii* LSU and/or ITS sequences would be interesting to evaluate their clustering when compared to related taxa in the trees proposed by Vizzini *et al*. (2014).

Geographical distribution: Known only by the type locality (Uhart & Albertó 2009). Habitat and substrate: lignicolous, on trunks of dead trees.

## Acknowledgements

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